VALIDITY DYNAMISM OF PERSONALITY TRAITS IN THE SELECTION CONTEXT

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Based on the theoretical suggestion and empirical evidence of the idea of performance dynamism (i.e., that an individual's job performance changes with the passage of time), this paper argues that the criterion-related validity of selection devices (i.e., the correlation between any selection device's score and an individual's job performance rating) should not be treated as a constant but rather as a changing figure. Using personality tests on the Big Five traits (i.e., Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) as example, this paper tries to explore how the magnitudes of personality traits as performance predictors might change over time based on the literature on the changes in job demands on motivation, stress-coping, socialization, and learning behavior—the aspects of a job most closely associated with personality traits—along with the studies on age-related changes in work motivation and coping strategies. Through meta-analytically examining the extent to which temporal variables operationalized in age or organizational tenure explain the significant variation in personality trait-job performance correlations across primary studies, this paper looks for evidence of criterion-related validity dynamism of the Big Five traits as one selection test assessed in the previous research. Although some hypotheses related to validity dynamism were not supported, this meta-analysis did indeed show that age explains some of the variability in findings for the Extraversion- and Agreeableness-job performance correlations. Moreover, job complexity

showed to be one moderating effect on the relationship between personality trait and job performance. Overall, this meta-analysis presented us with some preliminary evidence of the dynamic nature of the criterion-related validity of personality traits, demonstrating, at least in some instances, the flawed assumption of a static validity coefficient prevalent in selection research. This idea of validity dynamism integrated with the recent development in personality measurement and other personality trait-related models will push selection research as well as personality trait-job performance correlation research, more specifically, to a new era.

BIOGRAPHICAL SKETCH

Lian Shao was born on October 20, 1973 in Shanghai, China. She is the only child of Ms. Lingzhi Chen and Mr. Hongsen Shao. Lian spent her time in Shanghai until, on March 28, 1998, she moved to Montreal, Canada to pursue her higher education. In Montreal, she completed her Bachelor study in Human Resources Management in 2000 and obtained her Master of Science in Administration degree in 2002, both from the John Molson School of Business, Concordia University. In September 2005, Lian started her Ph.D. study in Human Resources Management, under the supervision of Dr. Michael Sturman, at the School of Hotel Administration, Cornell University.

Lian married her high school classmate, Kevin Chen, on February 15, 2002 in Charleston, South Carolina. Lian and Kevin have two boys: Felix, who was born on January 27, 2003 in Toronto, Canada, and Kenneth, who was born on June 15, 2009 in Ithaca, New York.

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CHAPTER 1

INTRODUCTION

The idea of dynamic criteria or dynamic performance (i.e., that an individual's job performance changes with the passage of time) is not new (e.g., Ghiselli, 1956; Ghiselli & Haire, 1960; Humphreys, 1960). Several theoretical works predicted that job performance changes over time, including Alvares and Hulin's changing task model (1972), Ackerman's task performance model (1987, 1988), and Murphy's job performance model (1989). Additionally, empirical research has consistently confirmed that individual performance changes over time (e.g., Barrett, Caldwell, & Alexander, 1985; Deadrick & Madigan, 1990; Hofmann, Jacobs, & Baratta, 1993; Hofmann, Jacobs, & Gerras, 1992; Hulin, Henry, & Noon, 1990; Ployhart & Hakel, 1998; Sturman, Cheramie, & Cashen, 2005). Performance dynamism has profound implications on the personnel selection research, where performance is often used as one critical criterion (Sturman, 2007). That is, if performance changes over time, the correlation between test scores on any individual selection device and job performance rating should change accordingly. Furthermore, the criterion-related validity of selection devices should not be represented by one single constant but by a set of numbers to reflect the dynamic nature of performance over time. Nevertheless, researchers (e.g., Ployhart, 2004; Sackett & Lievens, 2008; Sturman, 2007) point out that most personnel selection studies seem to have ignored the dynamic nature of job performance. A review of the empirical studies on personnel selection shows that this area of research has been dominated by the assumption of a static validity coefficient (e.g., Behling, 1998; Chait, Carraher, & Buckley, 2000; Stevens & Campion, 1999). There is thus a crucial

need for research to consider the validity of selection tools in light of our realization of a dynamic criterion (e.g., Ployhart, 2004; Sackett & Lievens, 2008).

In general, researchers (e.g., Ployhart, Schneider, & Schmitt, 2006; Sackett & Lievens, 2008; Sturman, 2007) argue about that there is little validation research of selection devices considering the idea of criteria dynamism. Among the few studies that test the changing validity between selection devices and job performance over time, most have been devoted to investigating how the relationship between general cognitive ability and job performance fluctuates over time (e.g., Deadrick, Bennett, & Russell, 1997; Farrell & McDaniel, 2001; Keil & Cortina, 2001; Ployhart & Hakel, 1998), and a much smaller body of research has examined how the magnitude of personality traits as performance predictors changes over time (e.g., Stewart, 1999; Thoresen, Bradley, Bliese, & Thoresen, 2004).

Nevertheless, personality traits are at least as critical as cognitive ability in predicting performance over time (e.g., Lievens, Ones, & Dilchert, 2009; Viswesvaran, Deller, & Ones, 2007). Several studies have demonstrated that personality tests account for distinct variance in measures of job performance beyond the variance accounted for by general cognitive ability tests (e.g., McHenry, Hough, Toquam, Hanson, & Ashworth, 1990), interviews (Cortina, Goldstein, Payne, Davison, & Gilliland, 2000), and assessment center ratings (Goffin, Rothstein, & Johnston, 1996). Moreover, compared with cognitive tests, personality tests predict job performance with no adverse impact on women and minorities (Hogan, 2005). Organizational leaders have also recognized the increasing efficiency of personality traits as performance predictors in workplaces characterized by ever-changing, dynamic environments (e.g., Hogan, Hogan, & Roberts, 1996; Hough, 1998; 2001; 2003; Hough & Ones, 2001; Hough & Oswald,

2000; 2005; 2008; Hough & Schneider, 1996; Howard, 1995; Ilgen & Pulakos, 1999; Latham & Ernst, 2006).

The deficiency in the empirical testing of the changing validity between personality traits and job performance creates a serious problem (e.g., Kaplan, Bradley, Luchman, & Haynes, 2009; Ployhart et al., 2006; Van Iddekinge & Ployhart, 2008); specifically, the current norm in personnel selection research of generalizing the criterion-related validity of personality tests over time hinders the effective development and validation of personality tests as one effective selection device (Van Iddekinge & Ployhart, 2008). In practice, decision makers might choose not to implement a personality test or make inaccurate selection decisions and, consequently, compromise the utility estimates of personality tests (Sturman, 2000).

Researchers have continuously urged one another to incorporate time into theory and research and suggest that theories become most robust when they are subject to empirical verification or falsification through precise and sensitive considerations of time (Ancona, Okhuysen, & Perlow, 2001; Bacharach, 1989; Fried & Slowik, 2004; George & Jones, 2000; Mitchell & James, 2001; Platt, 1964; Popper, 1959; Ployhart & Vandenberg, 2010). Five decades ago, Humphreys (1960) stated that "in selection research, one should not be satisfied with validation of predictors against the earliest possible criteria" (p.318) and that we need to predict the criterion of our interest, such as job performance, over a longer period of time. More recently, Ployhart and his colleagues (Ployhart et al., 2006) pointed out that if the predicted performance will not be stable over some reasonable amount of time, researchers must consider when to predict the performance in the validation research. In sum, a specification of how time moderates the relationship between variables often enriches and refines the theories.

This paper intends to build a theoretical understanding of the criterion-related validity dynamism of personality traits. This paper is also the first of its kind, focusing on workplace performance rather than academic performance by looking exclusively at overall job performance. Specifically, this paper tries to explore how the magnitudes of personality traits as performance predictors might change over time based on the literature on the changes in job demands on motivation, stress-coping, socialization, and learning behavior, the aspects of jobs most closely associated with personality traits, along with the studies on age-related changes in work motivation and coping strategies. For the purpose of integrating and substantiating the empirical findings as well as providing a theoretical groundwork for future validity studies, a meta-analytic review is used to investigate the criterion-related validity dynamism of personality traits, operationalized through examining the extent to which temporal variables, such as age or organizational tenure, explain the variation in personality trait-job performance correlations reported by primary studies included in this meta-analysis.

The dissertation is organized as follows: Chapter two, Literature Review, explains why theory predicts a dynamic rather than a static criterion-related validity of personality traits over time and develops the study's hypotheses; Chapter three, Method, describes the detailed procedures of meta-analysis as well as the judgment calls made throughout the meta-analysis procedures; Chapter four, Results, reports the results of the meta-analysis; and Chapter five, Discussion, provides discussion of the findings, draws conclusions, identifies study limitations, and describes some directions for future research.

CHAPTER 2

LITERATURE REVIEW

The Criterion-Related Validity Dynamism of Personality Traits over Time

Personality is defined as the relatively enduring pattern of thoughts, feelings, and behaviors over time and across situations (e.g., Connor-Smith & Flachsbart, 2007; Costa, 1996; Dweck & Leggett, 1988). Researchers generally agree that what people do is influenced by their personality traits (Mount, Barrick, Scullen, & Rounds, 2005). In the work context, research (e.g., Hough, 2001; Hough & Schneider, 1996) indicates that when personality measures are based on theory-relevant constructs and are correlated with job analysis-based performance measures, these variables tend to predict discretionary "will do" factors, which along with "can do" factors, jointly determine the level of job performance (McHenry et al., 1990).

The Five-Factor Model (FFM) of personality (or 'Big Five'), describing the basic dimensions of the normal personality, has been the most frequently used taxonomy in studying the relationship between specific personality traits and performance in various jobs (e.g., Barrick & Mount, 1991; Barrick, Mount, & Judge, 2001; Hurtz & Donovan, 2000; Salgado, 1997, 2003; Tett, Jackson, & Rothstein, 1991; Vincher, Schippman, Switzer, & Roth, 1998). These five dimensions (and their prototypical characteristics) include Conscientiousness (dependability, goal-orientation, and organization), Emotional stability (lack of anxiety, hostility, depression, personal insecurity, and negative affectivity), Extraversion (sociability, dominance, ambition, and positive affectivity), Openness to experience (intellectuality, creativity, unconventionality, and broad-mindedness), and Agreeableness (cooperation, trustworthiness, compliance, and affability) (e.g., Costa & McCrae, 1985; Digman, 1990). Research supports the FFM

dimensions' stability across one's life span, robustness, comprehensiveness, and generalizability across different theoretical frameworks with different assessments, rating sources, languages, and cultures (e.g., Costa & McCrae, 2002). Furthermore, research has confirmed the utility of using personality variables such as those included in the FFM in predicting work- and career-related behaviors or outcomes (e.g., Barrick et al., 2001; Hurtz & Donovan, 2000; Tokar, Fischer, & Mezydlo, 1998; Zimmerman, 2008).

The commonly used conceptual framework for research on personality trait-job performance relationship largely comes from two sources: the results of meta-analyses and mediator studies. Meta-analyses, based on the primary studies empirically linking the characteristics of personality trait and job performance with participants' self rating on personality traits and employee record for the job performance rating, serve as one primary conceptual framework for personality trait-job performance relationship studies. Barrick and Mount (1991) were the first to meta-analytically examine the correlation between each Big Five personality trait and job performance. Following this pioneering work, there are a number of meta-analytical studies on the personality trait-job performance relationship, including Salgado (1997), who adopted the European sample; Vinchur and his colleagues (1998), who focused on salespersons; and, most recently, Hurtz and Donovan (2000), who concentrated on samples using FFM-based personality measures. In 2001, Barrick, Mount, and Judge conducted a secondary meta-analysis (i.e., a meta-analysis of meta-analytical studies) on the correlation between each Big Five personality trait and job performance. The results of these meta-analytical studies consistently showed Conscientiousness and Neuroticism as significant predictors of overall job performance whereas the other personality traits, such as Openness, Extraversion, and Agreeableness, correlated with some particular, but not overall, performance dimensions.

Other than the meta-analyses, the study of mediators between the personality trait-job performance relationships is often used as conceptual framework for the personality trait-job performance relationship studies. Such studies primarily focused on the socioanalytic perspective of job performance. For example, Barrick, Mount, and Strauss (1993); Barrick, Stewart, and Piotrowski (2002); and Hogan and Shelton (1998) suggested motivations, such as motivations to get things done, to get ahead, and to get along with others, serve as the primary mediators of the personality trait-job performance relationship (Barrick, Stewart, & Piotrowski, 2002; Hogan, 1996; Hogan & Shelton, 1998; Wiggins & Trapnell, 1996).

In addition to its proxy to motivation (e.g., Barrick et al., Barrick, Mitchell, & Stewart, 2003), personality traits are often related to job performance through stress coping (e.g., Bolger, 1990; Bolger & Zuckerman, 1995; Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007; Fogarty, Machin, Albion, Sutherland, Lalor, & Revitt, 1999; Gilboa, Shirom, Fried, & Cooper, 2008; O'Brien & DeLongis, 1996; Watson & Hubbard, 1996). Stress in the workplace comes from different sources, such as quantitative job demands (i.e., work overload or time pressure), role conflict (i.e., when conflicting demands at job have to be met), role ambiguity (i.e., when there is a lack of adequate information to do the job well), lack of support from colleagues or supervisors, lack of feedback, or limited chances to participate in decision making (e.g., Fogarty et al., 1999). Different personality traits often evoke different reactions to these stressors and influence the processes by which an individual constructs stress coping strategies (e.g., Bolger, 1990; Bolger & Zuckerman, 1995; Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007; Saks & Ashforth, 2000).

Personality is also related to job performance through its impact on individuals' behaviors. Behavior has been conceptualized as one important manifestation of one's underlying

thoughts and feelings (Furr, 2009). One way to derive personality is from self assessments of the frequencies with which specific acts are performed during a specified period of time (Digman, 1990). Therefore, the study of behavior is integral to the field of personality psychology; a multitude of theories rely on behavior to explain the mediation of psychological processes (Furr, 2009). Personality-related socialization behavior and learning behavior are the focus of this paper. Generally, some personality traits relate to socialization behavior through inspiring individuals to actively initiate contact with organizational members (Cuperman & Ickes, 2009; Snyder & Ickes, 1985), and some facilitate learning through increasing motivation to learn and setting highly challenging goals (Colquitt, LePine, & Noe, 2000; Elliot, 1999; Elliot & Church, 1997; Elliot & Thrash, 2002; Ford & Oswald, 2003; Noe, 1986).

In sum, individual differences in personality traits tend to lead to differences in work motivation, coping strategies, and behaviors in socializing as well as in learning, all of which relate to job performance.

In general, a new work environment is often characterized as being loaded with stress: for example, new hires are often plagued with ambiguity concerning with their roles, uncertainty about their abilities to cope with organizational demands, and the "reality shock" as a result of unrealistic expectations of organizational life. Also, a new work environment often places a high demand on learning and adapting quickly as well as initiating contacts and building positive relationship with colleagues, supervisors, and customers. Personality traits that contribute to the successful fulfillment of these requirements in terms of stress-coping, learning, and contact initiating often help new hires achieve higher levels of job performance. However, over time, when individuals have become familiar with the work environment, mastered the job-related skills and knowledge, and established their networking in the organization, these traits might no

longer serve as efficient performance predictors, or, at least their efficiency as performance predictors is not as strong as that for young employees or those who are new to the organization.

In order to realize the full potential of personality traits as effective selection devices, in the following sections, I will discuss in detail when and why the magnitudes of each Big Five personality trait as performance predictors are expected to change over time based on the literature on how personality trait is related to work motivation, coping strategies, learning behavior, and socialization behavior and the change of these job requirements over time as well as studies on the age-related and organizational tenure-related changes in work motivation and coping strategies.

The Criterion-Related Validity Dynamism of Conscientiousness

Conscientiousness refers to individual differences in impulse control, conformity, organization, and determination (Digman, 1990). People with high Conscientiousness are achievement-oriented (i.e., hardworking and persistent), dependable (i.e., responsible and careful), and orderly (i.e., planned and organized) (Costa & McCrae, 1992). Meta-analytic research has consistently supported Conscientiousness as one personality-based predictor with generalizable validity across occupations and job situations (Barrick & Mount, 1991; Barrick et al., 2001; Hurtz & Donovan, 2000; Mount & Barrick, 1995; Salgado, 1997). Furthermore, out of the Big Five, Conscientiousness has the highest criterion-related validity. One recent second-order meta-analysis, which quantitatively summarized the results of fifteen prior meta-analytic studies on the personality trait-job performance relationship, shows the average true score correlation estimates between Conscientiousness and job performance ranging from the mid .20s to low .30s (Barrick et al., 2001).

Conscientiousness, at its core, encompasses general motivational resources and influences job performance through its close relationship with work motivation (e.g., Barrick et al., 2002; Chen, Casper, & Cortina, 2001; Gellatly, 1996; Kanfer & Heggestad, 1997; Stewart, 1999), a variable of considerable importance for all types of performance. Conscientious individuals, in general, are expected to perform better because characteristics of this trait are closely associated with the three choice behaviors, the combined effect of which is often defined as motivation (Campbell, 1991): first, the choice to set goals (due to conscientious individuals' attributes of being organized and well thought-out); second, the choice to set difficult and challenging goals (due to conscientious individuals' attributes of being achievement-oriented and hardworking); and finally, the choice to persist in the goal pursuit (due to conscientious individuals' attributes of being responsible and persistent) (e.g., Barrick, Mount, & Strauss, 1993; Barrick et al., 2002; Gellatly, 1996; Hollenbeck & Williams, 1987; Hollenbeck, Williams, & Klein, 1989). Empirical research has shown positive relationships between the facets of Conscientiousness and personal goal choice (Matsui, Okada, & Kakuyama, 1982; Yukl & Latham, 2006), perceived probability and importance of goal attainment (Hollenbeck & Brief, 1987), goal commitment (Hollenbeck et al., 1989), and outcome measures such as effort level (Steers, 1977) and task performance (Matsui et al., 1982). In sum, Conscientiousness has been found to influence job performance through inspiring individuals to "get things done," as conscientious employees' strong desire to fulfill their obligations is often reflected in their task accomplishment in the workplace (Barrick et al., 2001).

Conscientiousness exerts some immediate influence on job performance among new hires due to its basic dimensions of organization, dependability, and vigilance (Stewart, 1999) in that new hires with strong organizational skills are able to develop plans for mastering job duties and

for applying previously learned behaviors to a new job; those individuals who are dependable are able to build congenial interpersonal relationships with colleagues and supervisors; and new hires who are vigilant and detail-oriented are able to quickly familiarize themselves with new procedures (e.g., VandeWalle, Brown, Cron, & Slocum Jr., 1999).

High levels of Conscientiousness are also expected to help new hires achieve strong job performance in regards to learning (Martocchio & Judge, 1997). Specifically, high Conscientiousness is closely linked to high task-specific self-efficacy beliefs, and, generally speaking, individuals with high self-efficacy set especially challenging goals and exert greater effort to master those challenges. Highly conscientious individuals, due to their high task-specific self-efficacy, tend to ignore minor criticisms, discount small failures, and avoid negative thoughts. As a result, they maintain positive thinking during challenging learning processes and are more likely to achieve a higher level of learning in competitive learning situations (Martocchio & Judge, 1997). As new hires are often expected to quickly learn a significant amount of both qualitative and quantitative information, the characteristics associated with Conscientiousness that help new hires to master learning are expected to be positively linked to job performance. Additionally, conscientious individuals, who are more achievement-oriented, are highly motivated to learn and are more likely to engage in activities to prepare for the future or to take on more responsibilities in the workplace (Major, Turner, & Fletcher, 2006). Empirical studies show a correlation of .16 between Conscientiousness and motivation to learn, an indication of desire and willingness to exert effort toward learning and development (Major et al., 2006). In sum, Conscientiousness, due to its facilitation of learning from both the perspective of maintaining positive thinking during challenging learning processes and that of

staying motivated to learn, is expected to have a strong relationship with performance among new hires, who often need to learn the most in a limited period of time.

Besides learning, the performance of newcomers also depends on how they are able to deal with stressors, which are often intense due to role ambiguity or workload (e.g., Fogarty et al., 1999; Saks & Ashforth, 2000). From the perspective of the conservation of resource theory—the central tenet of which is that people strive to obtain and maintain resources that help attain goals (Hobfoll, 1989)—Conscientiousness has been treated as a personal characteristic resource in that it affects how individuals spend resources and handle the loss of resources (Hobfoll & Shirom, 2001). Specifically, research suggests that conscientious individuals tend to engage in active problem-solving to lower their vulnerability to stress, one form of resource loss (e.g., David & Suls, 1999; Vollrath & Torgersen, 2000; Wayne, Musisca, & Fleeson, 2004; Witt & Carlson, 2006). In a related vein, research suggests that the strong attention-regulation capacity underpinning Conscientiousness enables conscientious individuals to disengage from powerful negative thoughts on stressors and to restructure their cognition of the stressors (Carver & Connor-Smith, 2010). One recent meta-analysis (Connor-Smith & Flachsbart, 2007) investigating the relationship between personality traits and coping strategies shows that Conscientiousness exhibits a positive relationship with both problem solving approach (.30) and cognitive restructuring (.20) when dealing with stressors. Researchers generally agree that because of the competence, achievement-striving, and persistency characteristics of Conscientiousness, conscientious individuals often rely on problem-solving coping, such as taking steps to remove the stressors or diminishing their negative impact if the stressors cannot be evaded (e.g., Carver & Connor-Smith, 2010; Watson & Hubbard, 1996).

In sum, the characteristics of Conscientiousness facilitate new hires to carry out work in their new environment through an accelerated learning process and the effective management of stressors, which, in turn, often lead to stronger job performance.

However, Conscientiousness is not expected to consistently predict job performance throughout the employment tenure (e.g., Meyer, Dalal, & Bonaccio, 2009). Generally, a high level of Conscientiousness contributes to the higher level of performance among new hires but more so in veteran employees through the close linkage between Conscientiousness and self-management (Gerhardt, Rode, & Peterson, 2007; Judge & Ilies, 2002; Markham & Markham, 1995; Morossanova, 2003). Self-management, which consists of a set of behavioral and cognitive strategies that assist individuals in constructing their environment, establishing self-motivation, and facilitating behaviors appropriate for obtaining performance standards, helps employees attain their desired performance in the long run (Frayne & Geringer, 2000; Frayne & Latham, 1987). Empirical studies show that conscientious employees' tendency to exercise self-management tactics helps them achieve continuous improvement in job performance (Thoresen et al., 2004). Specifically, researchers (Helmreich, Sawin, & Carsrud, 1986) found that most new hires are highly motivated and usually exert extra effort to do their jobs. That is, during the initial stage of employment tenure, the novelty of the job and work environment tends to reduce individual differences in work motivation. As a result, Conscientiousness, which differentiates individuals in their level of motivation to continuously strive for high performance, is less predictive of job performance initially than it is in later stages of employment. That is, when the "honeymoon effects" of a new job wear off (i.e., in the later years of employment), highly Conscientious individuals, who tend to possess a stronger desire for the continuous pursuit of performance improvement, are expected to demonstrate higher levels of job performance than

their colleagues low in Conscientiousness (e.g., Hanges, Schneider, & Niles, 1990; Murphy, 1989; Thoresen et al., 2004; Tracey, Sturman, Shao & Tews, 2010).

Similarly, in a study examining the changes in newcomer job satisfaction over time, researchers suggested that individuals are likely to think highly of a new role in a new organization, minimizing the influence of unfavorable elements and magnifying the positives of the organization (Boswell, Shipp, Payne, & Culbertson, 2009). Correspondingly, newcomers usually exhibit high job satisfaction (Ashforth, 2001). However, high motivation and job satisfaction, due to the "newness" of the situation, often decline once the situation normalizes: individuals become more settled, engage in more routine job activities, and begin to encounter the less-attractive aspects of the job (e.g., Ashforth, 2001; Ashforth & Kreiner, 2002; Chatman, 1991; Louis, 1980; Meglino & DeNisi, 1987). Early research on the stability of post-decision dissonance (Lawler, Kuleck, Rhode, & Sorensen, 1975; Vroom & Deci, 1971) revealed a marked reduction in rated job attractiveness as individuals master the knowledge required for their jobs. Accordingly, employees' motivation to exert extra effort in their jobs diminishes over time. Nevertheless, conscientious individuals, who tend to exercise self-control as well as self-management thereby following the dictates of their consciences (Costa & McCrae, 2002), are expected to fulfill their obligations, maintaining a high level of performance even after the "honeymoon" period concludes. Consistently, research found that conscientious individuals' persistence and self-discipline often guide them throughout tasks and help them accomplish things in the long run (e.g., Deary, Blenkin, Agius, Endler, Zealley, & Wood, 1996; Deary, Whalley, Lemmon, Crawford, & Starr, 2000; Piedmont, 1993). Likewise, Conscientiousness was often associated with job dedication (e.g., Dudley, Orvis, Lebiecki, & Cortina, 2006) and career success, such as performance-based promotions (Judge, Higgins, Thoresen, & Barrick,

1999), as the behavioral expressions of Conscientiousness, such as being hard-working and taking initiatives to solve work problems, often covary with the level of job dedication, the deliberate intention to promote the organization's best interests over time (Van Scotter & Motowidlo, 1996), as well as the supervisors' judgment of overall performance (Van Scotter & Motowidlo, 1996).

It seems that high Conscientiousness facilitates more to the performance among veteran employees than among newcomers to an organization. When the motivation derived from the situational novelties wears off, highly conscientious veteran employees are more likely to maintain a strong desire to continuously pursue improvement in performance, to persist in goal-directed behavior, and to apply self-control to fulfill their obligations, which, in combination, contribute to strong long-term job performance (Costa & McCrae, 2002). Thus, Conscientiousness is expected to serve as a better predictor of job performance as individuals gain job tenure.

Hypothesis 1: The positive relationship between Conscientiousness and job performance increases over time.

The Criterion-Related Validity Dynamism of Emotional Stability/Neuroticism

Emotional stability and Neuroticism are the respective labels for the positive and negative pole of the same construct, and labels are used interchangeably in most studies[1] (Barrick & Mount, 1991). Neuroticism refers to the state of being generally nervous, anxious, insecure, irritable, and depressed, as opposed to resilient, confident, secure, assured, and stable (Costa & McCrae, 1985; 1989; Digman, 1990; Saucier & Ostendorf, 1999). Individuals high in

[1] To avoid any confusion in the later discussion, rather than using these two terms interchangeably, I only use Neuroticism in this paper. For studies reporting the correlation between Emotional Stability and job performance, I simply use the opposite directional sign.

Neuroticism are prone to experience negative affectivity and high levels of psychological distress (Hollenbeck, Moon, Ellis, West, Ilgen, Sheppard, Porter, & Wagner, 2002) and adopt negative lenses to interpret their environment (Judge, Locke, Durham, & Kluger, 1998).

Most meta-analyses suggest that Neuroticism is the one FFM dimension besides Conscientiousness that is significantly correlated with job performance in virtually all jobs (e.g., Hurtz & Donovan, 2000; Salgado, 1997; Tett et al., 1991). Salgado (1997) detected a negative, nonzero relationship ($\rho = -.19$) between Neuroticism and job performance based on all available studies of personality and job performance in the European Economic Community (EEC). Similarly, Tett and his colleagues (Tett et al., 1991) identified that Neuroticism displayed a non-zero correlation with job performance ($\rho = -.22$). Hurtz and Donovan (2000) found that Neuroticism predicted three major performance dimensions—task performance ($\rho = -.13$), job dedication ($\rho = -.13$), and interpersonal facilitation ($\rho = -.16$)—equally well. Consistent with the finding of the negative correlation between Neuroticism and contextual performance dimensions of job dedication and interpersonal facilitation (Hurtz & Donovan, 2000), research (Kaplan et al., 2009) further identified that neurotics are less likely to go above and beyond their formal job description to engage in contextual behaviors in general, as neurotics, who are predisposed to dwell on negatives and often experience stressors at work, are less likely to feel that they have the sufficient time, emotional energy, or ability to contribute to the nonessential task. Furthermore, recent research suggests that employees with high levels of Neuroticism are expected to exhibit a downward spiral of efficacy and ultimately lower future performance (e.g., Barsky, Thoresen, Warren, & Kaplan, 2004; Kaplan et al., 2009). Researchers explained that employees high in negative affectivity (i.e., Neuroticism), who exhibit persistent self-doubt (Watson & Pennebaker, 1989) and react strongly to negative stimuli (Barsky et al., 2004;

Spector, Fox, & Van Katwyk, 1999), not only have difficulty in initiating task activities or setting appropriately ambitious goals but also have trouble achieving high levels of job performance in the long term (e.g., Cook, Vance, & Spector, 2000). These findings seem reasonable given that the core characteristic of Neuroticism is often closely and negatively related to work motivation and job satisfaction and consequently inhibits employees from carrying out effective performance, either task performance or contextual performance, under most circumstances.

As per the negative connection between Neuroticism and work motivation, employees with high levels of Neuroticism lack confidence, tending to see themselves as incapable of successfully performing a given activity or less worthy of success, particularly when they are required to deal with obstacles in their pursuit of goals (Bandura & Locke, 2003; Judge et al., 1998). Correspondingly, neurotic individuals often do not set challenging goals for themselves, persist in the face of obstacles, or undertake many demanding tasks in the first place. That is, neurotic employees are less motivated to accomplish tasks at work, and if they are motivated at all, their motivation is simply to avoid failure (Barrick et al., 2003). In a similar vein, research found that neurotics are particularly sensitive to the aversive motivational-system, which promotes attention to negative stimuli and inhibits behavior to avoid punishment (Carver & White, 1984). In order to minimize unpleasant arousal, neurotics usually adopt disengagement strategies such as avoidance and withdrawal (Connor-Smith & Flachsbart, 2007). One recent meta-analysis (Connor-Smith & Flachsbart, 2007) shows strong relationships between Neuroticism and broad disengagement coping (.27) and withdrawal (.29), a specific disengagement response to stressors. Correspondingly, another recent meta-analysis (Payne, Youngcourt, & Beaubien, 2007) found that, out of the Big Five personality traits, Neuroticism is

the only trait that exhibited significantly negative association with the desire to prove one's competence and to gain favorable judgment about it.

With regard to the negative link between Neuroticism and job satisfaction, research found that neurotic employees who are prone to negative emotions are more likely to recall negative job-related information and experience dysfunctional job-related thought processes, therefore undergoing a lower level of job satisfaction (e.g., Judge & Bono, 2001; Judge & Locke, 1993; Necowitz & Roznowski, 1994; Riketta, 2008). Likewise, people experiencing frequent negative emotions at work tend to dwell excessively on their failures (Watson & Slack, 1993) and act in ways that estrange them from coworkers (Brief, Butcher, & Roberson, 1995). Two recent meta-analytic reviews have demonstrated the negative role of Neuroticism in job satisfaction: Judge, Heller, and Mount (2002) found a negative relationship ($\rho = -.29$) between Neuroticism and job satisfaction generalized across occupational settings, and Connolly and Viswesvaran (2000) found a mean true correlation of -.33 between job satisfaction and negative affect, an equivalence of Neuroticism (Watson & Clark, 1992).

In addition to its negative relationship with work motivation and job satisfaction, Neuroticism might be particularly detrimental to the performance of new hires with respect to its association with stress perceptions and stress handling (e.g., Saks & Ashforth, 2000). Individuals who have undergone a transition into a new organization are often placed in high-pressure situations (Katz, 1985). Specifically, newcomers are plagued with ambiguity concerning their roles in the organization (Fisher, 1985; Miller & Jablin, 1991), uncertainty about their abilities to cope with organizational demands, and the 'reality shocks' as a result of unrealistic expectations of organizational life (Wanous, 1992). These stressors have been identified as particularly troublesome for neurotic newcomers (e.g., Saks & Ashforth, 2000).

Neurotics, who hold negative self-concept (Burke, Brief, & George, 1993), tend to dwell on the negative aspects of stimuli (Watson & Clark, 1984) and often report stress (e.g., Brief, Burke, George, Robinson, & Webster, 1988; Schaubroeck, Ganster, & Fox, 1992).

Moreover, neurotics are also less capable than their emotionally stable colleagues of adapting to a wide range of situational demands (Erickson, Newman, & Pincus, 2009; Saks & Ashforth, 2000). Research found that Neuroticism has been associated with the use of ineffective stress coping strategies (Bolger, 1990; Heppner, Cook, Wright, Johnson, 1995), such as avoiding and distracting strategies (e.g., denying, wishful thinking, and self-criticism) rather than approaching strategies (e.g., problem solving and proactive behavior) (Bolger, 1990; McCrae & Costa, 1986). Due to neurotics' vulnerability to experience anxiety and general distress, the mere presence of intense emotional arousal can interfere with the use of approaching strategies that require confidence (Carver & Connor-Smith, 2010). That is, individuals low in emotional stability, who tend to be self-conscious and have low self-esteem (Judge & Ilies, 2002), often give up easily when dealing with stressful situations.

Also, a number of empirical studies have supported that Neuroticism is associated with the production of task-irrelevant thoughts and cognitive interference, and the efforts to regulate negative affective experiences often interfere with the attentional resources available for task performance (e.g., Howell & Conway, 1992; Kanfer & Ackerman, 1989; Koy & Yeo, 2008; Yeo & Neal, 2004). Specifically, neurotic people tend to be frequently distracted by aversive emotions such as fear, anxiety, embarrassment, and disappointment, as well as unnecessary worrying, which divert their attention away from performing their job functions and towards regulating the distractor. As individual attentional and cognitive resources are limited (Kanfer & Ackerman, 1989), such distraction will compromise the task performance and, in particular, the

skill acquisition among new hires (Jex, 1998). In a similar line of reasoning, researchers suggest that an automatic orientation of attention (i.e., a constant regulation of the negative effects from the aversive emotions) creates a condition of information overload and often leads to a compromised perceptual attention such as ignoring performance-related information and cues and deleteriously affects job performance (Wallace & Newman, 1998).

In addition to its influences on perceptions of and management of stresses, Neuroticism is expected to affect job performance among new hires from the perspective of contact initiating. Compared to the new hires low in Neuroticism, who tend to perceive social interactions as smooth, natural, and relaxed, neurotic newcomers regard social interaction as being forced, awkward, and strained. Therefore, neurotics usually have difficulty in initiating contact or establishing positive interpersonal relationships with others (Cuperman & Ickes, 2009), which are particularly important for new hires to get familiar with the working environment and procedures and ultimately fulfill their roles in the organization.

In sum, Neuroticism is expected to inhibit new hires from achieving high levels of job performance, and the negative link between Neuroticism and workplace behaviors seems to have been mostly mediated by either perceived or actual job stress (Kaplan et al., 2009). Neurotics not only are predisposed to negative feelings, focus on the negative aspects of a situation, and expose themselves to stressors (e.g., Burke et al., 1993; Chen & Spector, 1991; Levin & Stokes, 1989; Suls, Green, & Hillis, 1998; Swider & Zimmerman, 2010; Watson & Clark, 1984; Weiss & Cropanzano, 1996), but they are also less capable than their emotionally stable colleagues of adapting to a wide range of situational demands (Erickson et al., 2009; Saks & Ashforth, 2000).

Nevertheless, compared with new hires, veteran employees are less susceptible to workplace stress. Their vast knowledge of the work system and their familiarity with the

working environment in terms of the job requirements, procedures, and their coworkers relieve them from negative impacts of stressors, most of which come along with a new environment (Chatman, 1991; Louis, 1980). In other words, the number of uncertainties and the accompanying stresses experienced by veteran employees are greatly reduced compared with their colleagues who are new to the organization. As a result, Neuroticism, which is closely associated with how well individuals perceive and are able to handle stresses in a new environment, becomes less critical in predicting job performance for veteran employees. In addition, researchers found that older adults displayed higher levels of emotional intelligence than younger adults, being better able to regulate their moods and controlling their emotions at work (Chapman & Hayslip, 2006; Gross, Carstensen, Tsai, Skorpen, & Hse, 1997; Siu, Spector, Cooper, & Donald, 2001). That is, if emotion regulation is defined as the extent to which individuals' attempt to influence which emotions they have, when they have them, and how these emotions are experienced or expressed, older adults are more competent in regulating their emotions. For example, a pattern of selective increases in positive emotion and decreases in negative emotion emerges among older adults, as older adults' greater control of emotion permits them to selectively enhance positive emotions and dampen their experience of aversive negative emotions (Gross et al., 1997). Researchers explain that the age-related increase in capability of emotion management is the result of the increased control beliefs with age, accumulated coping resources over time, and the increased use of active reappraisal of environment as one emotional regulatory mechanism (e.g., Aldwin, 1991; Siu et al., 2001). Altogether, it seems reasonable to predict that

Hypothesis 2: The negative relationship between Neuroticism and job performance decreases over time.

The Criterion-Related Validity Dynamism of Extraversion

Extraversion is characterized by a tendency to be self-confident, dominant, active, excitement-seeking, and optimistic (Costa & McCrae, 1992). Accordingly, extraverts show a higher frequency and intensity of personal interactions and positive emotions as well as a distinct focus on the positive aspects of experiences (Watson & Clark, 1992).

Different from the dimensions of Conscientiousness and Neuroticism, which emerge as significant predictors of job performance in virtually all jobs (Barrick & Mount, 1991; Barrick et al., 2001; Hurtz & Donovan, 2000; Mount & Barrick, 1995; Salgado, 1997), Extraversion is primarily related to job performance in occupations where a significant portion of the job requires interactions with others (e.g., Vinchur et al., 1998). One prevalent explanation of such relationship is that highly extraverted employees are capable of initiating contact with as well as getting along with others (e.g., customers, coworkers, and supervisors). Therefore, extraverts usually perform efficiently in working contexts involving intensive social interactions. For example, research overwhelmingly suggests that extraverts do well in sales jobs (Vinchur et al., 1998) and in training programs involving social interactions (e.g., assessment center, on-the-job training for salesperson) (e.g., Barrick & Mount, 1991). One second-order meta-analysis shows a correlation of .16 between Extraversion and teamwork, as well as a correlation of .28 between Extraversion and training performance. At the same time, the correlation between Extraversion and overall job performance could not be distinguished from zero (Barrick et al., 2001).

Extraversion is particularly helpful in achieving higher performance levels among new hires. Given the social nature of work, extraverts, who tend to approach their work with vigor, initiative, and energy, are more likely to establish positive and productive social relationships, which should result in higher job performance (e.g., Day & Schleicher, 2006; Erez & Judge,

2001; Lyubomirsk King, & Diener, 2005). Specifically, an effective work relationship with colleagues and supervisors often assists newcomers to learn behavioral patterns, tasks and challenges (Jokisaari & Nurmi, 2009); obtain feedback on their function in relation to role requirements (Bauer, Bodner, Erdogan, Truxillo, & Tucker, 2007; Graen, 1976); and understand the responsibilities and goals of the jobs (i.e., role clarity) (Seibert, Kraimer, & Liden, 2001). Generally, frequent social interaction often helps newcomers to learn the skills and routines required to perform the job and ultimately master the work. When newcomers have confidence in their potential to master a job, they are likely to make more effort and show perseverance in their tasks and in their cooperation with other workers (e.g., Bandura, 2001; Jokisaari & Nurmi, 2009). Additionally, employees, who usually receive timely and constructive feedback, clearly understand role expectations and are more likely to perform well (Griffin, Neal, & Parker, 2007). At the same time, employees' lack of knowledge of what is expected of them often hampers and constricts any purposeful effort to attain performance-related objectives (e.g., Tubre & Collins, 2000). A recent meta-analysis reported a correlation of -.24 between role ambiguity (i.e., low role clarity) and general performance (Gilboa et al., 2008). Research in general agrees that establishing and maintaining effective work relationships allows for task coordination, information flow, and other work processes that are necessary for accomplishing the goals and objectives of an organization (Day & Schleicher, 2006). Simply put, work would not be accomplished (at least not effectively) without a foundation of networked relationships in an organization, particularly for newcomers.

The positive association between Extraversion and job performance among newcomers is also expected given extraverts' strong approach tendencies when dealing with job stresses (Carver & Connor-Smith, 2010). Extraversion is often associated with the use of rational,

problem-solving coping strategies such as positive reappraisal and social-support seeking (Watson & Hubbard, 1996). That is, whenever confronted with stressful situations, extraverts not only focus on the positive aspects of such experiences but also resort to social-support seeking (Watson & Hubbard, 1996). Extraverts, who are generally highly motivated to interact with others and spend more time socializing with others, often turn to others for support during stressful times (Chiaburu & Harrison, 2008; Watson & Hubbard, 1996). For example, research shows that when experiencing stress on the job, extraverts as well as emotionally competent individuals often seek feedback about expectations from their supervisors (Kim, Cable, Kim, & Wang, 2009). Supervisory feedback-seeking usually helps employees understand their organization's rules and their supervisors' expectations (Kim et al., 2009). The information acquired from supervisors on norms, expectations, and standards often serves as an efficient guide to employees' behavior, enhancing employees' organizational integration and helping relieve their stress (Morrison, 1993). Research (Jokisaari & Nurmi, 2009) further demonstrates that among organizational insiders, supervisors in particular make a major contribution to newcomers' successful transition; specifically, supervisors have a formal authority in role negotiation and therefore have an opportunity to influence newcomers' work assignments and goals. The role behavior expected of newcomers is not the same as that expected of experienced insiders. Often, newcomers may be given simple tasks first and are held to different time or quality standards than the experienced incumbents (Fisher, 1986). Therefore, continuous interaction with supervisors often provides newcomers the necessary performance feedback to help them complete their work successfully (Jokisaari & Nurmi, 2009). In sum, Extraversion contributes to new hires' performance, partially due to its tendency to drive individuals to actively seek support from supervisors in stressful situations.

A positive relationship between Extraversion and job performance is expected from the perspective of another important characteristic of extraverts, the tendency to adopt a positive lens to interpret the world around them. Research from social psychology indicates that positive thinking about the future among extraverts has positive effects on motivation and performance (Aspinwall, 2005; Oettingen & Mayer, 2002; Zacher, Heusner, Schmitz, Zwierzanska, & Frese, 2010). Consistently, a growing body of research shows that people in positive moods make better decisions (e.g., Carnevale & Isen, 1986; Estrada, Isen, & Young, 1997), are more motivated (Erez & Isen, 2002), and generally perform better in a variety of tasks (Isen, 1999; Judge & Erez, 2007). In a similar vein, research has found that higher positive affectivity (i.e., Extraversion) is associated with greater expectancy (Wegener & Petty, 1996) and optimism (Forgas & Georege, 2001), fostering various behaviors beneficial to performance, particularly the performance of new hires. Specifically, those high in Extraversion may set more demanding goals (George & Brief, 1996), demonstrate greater determination, engage in effective problem-solving strategies (Elliot, Harkins, Sherwin, & Marmarosh, 1995), and utilize more efficacious coping strategies (e.g., Judge et al., 1999). Thus, the positive expectations held by extraverts often result in completing particularly challenging work tasks and achieving higher performance levels.

Furthermore, Fredrickson and colleagues (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008) proposed that positive emotions, closely associated with Extraversion, broaden people's attention and thinking, enabling them to draw on higher-level connections and a wider-than-usual range of perceptions or ideas rather than narrowly focusing on threats. These broadened outlooks often help people to discover and build consequential social and psychological resources. Social resources involve having a positive attitude towards oneself and others, as well

as the ability to give and receive emotional support. Psychological resources involve a feeling of competence about one's life such as environmental mastery, purpose in life, and ego-resilience (Fredrickson et al., 2008). People with both of these sets of resources are more likely to effectively meet challenges and take advantage of opportunities, becoming successful and happy (Fredrickson et al., 2008). These personal resources are also expected to exert positive effects on work. Empirical research (Zellars & Perrewe, 2001) shows that Extraversion is positively associated with providing colleagues with all three forms of emotional social support: regarding non-work-related topics, the negative aspects of work, and the positive aspects of work. In return, extraverts are more likely to receive these emotional social supports from their colleagues. Such social supports at work often help reduce job stresses and increase job satisfaction and job performance, particularly among new hires. In sum, I expect these features of extraverts—being sociable, using strong approach tendencies to deal with stresses, and interpreting things through a positive lens—will contribute to initial job performance.

However, Extraversion as a predictor of job performance is not expected to be consistent throughout the employment tenure. Certain qualities of extraverts (e.g., sociability and the ability to interpret the world through a positive lens) lend themselves particularly well to newcomers' success in an organization, helping them to build positive social relationships and broaden their perspectives. Veteran employees, though, with their well-established social networks and clear understanding of the organizational structure, do not see such dramatic benefits from Extraversion.

Additionally, a weakened Extraversion-job performance correlation over time is expected from the perspective of one prominent feature associated with extraverts: rewards-oriented motivation to excellence and achievements. Research shows that even though both

Conscientiousness and Extraversion consist of an element of achievement motivation (i.e., the tendency to set and work toward personal goals and/or standards), the achievement motivation associated with Conscientiousness is often intrinsic-oriented as opposed to extrinsic-oriented with Extraversion (Story, Hart, Stasson, & Mahoney, 2006). In other words, the achievement motivation among conscientious individuals often involves internal processes through which people come to identify with and internalize the value of an activity, such as work ethic (i.e., to enjoy the work for its own sake), pursuit of excellence (i.e., to meet a personal standard of excellence), competitiveness (i.e., to outperform others), or mastery (i.e., to solve or perform challenging tasks). On the other hand, the achievement motivation among extraverts is often induced from external demands, such as acquiring money and material wealth, dominance (i.e., to exert influence on others), or status (i.e., to climb the "social ladder") (e.g., Deci & Ryan, 2008a, 2008b). Researchers (Thoresen et al., 2004) emphasized that Extraversion is linked to job performance through the mediator of expectancy motivation (Judge & Iles, 2002), such that extraverts continue to strive for achievement only when they see the link between effort and performance and the connection between job performance and the rewards that they value. Empirical findings show that the increases in sales among extraverted salespersons are mostly because of the salary increases or promotions that come along with the increased sales volume (Barrick et al., 2002; Stewart, 1996). That is, Extraversion is related to high performance only on the performance dimensions that are explicitly rewarded or in situations where one can acquire and maintain status (Barrick et al., 2002). Some even suggest that, from the motivational perspective, the primary essence of Extraversion is sensitivity to obtaining rewards rather than sociability (Ashton, Lee, & Paunonen, 2002; Lucas, Diener, Grob, Suh, & Shao, 2000). Similarly, the Extraversion-Introversion dimension has been suggested to closely align with

individual differences in the behavioral activation systems, which regulate reactions to signals of conditional reward and nonpunishment (Carver & White, 1994; Gray, 1970). Extraverts are more sensitive than introverts to the signals of reward, and this reward sensitivity comes in the form of enhanced information processing and increased positive emotions when exposed to positive stimuli. Such reward-oriented motivation to achieve is particularly useful in predicting the Extraversion-job performance relationship over time. Research found, in general, a negative relationship between age and reward-oriented motivation to achieve (e.g., Ebner, Freund, Baltes, 2006; Judge & Hulin, 1993; Rhodes, 1983), such that individuals start accepting what is available to them and lessen their expectations for greatness or aspiration for rewards after a certain age. Specifically, Ebner and his colleagues (2006) found that older individuals tend to frame their goal orientation around maintaining the status quo or preventing loss rather than striving for gains. That is, the strong motivation to seek rewards-oriented achievement among extraverts might start diminishing after a certain point of employment. When applying this finding to predict the relationship between Extraversion and job performance over time, it seems reasonable to expect a weakened relationship, as, at a certain point of employment, veteran employees become fairly certain of their future with the organization, such as their chances of getting promoted or rewarded. Once the extraverts perceive or detect that the link between effort and rewards that they value gets weaker or disappears, they might hold back their effort toward tasks or withdraw effort completely. As a result, the strong correlation between Extraversion and job performance expected among the new hires will disappear among veteran employees.

Rewards-oriented motivation to excellence and achievement, a trait often associated with Extraversion, can also be applied to the maintenance of a positive subordinate-supervisor relationship and help explain the expected weakened relationship between Extraversion and job

performance over time. Specifically, research suggests that supervisor support will not be consistent throughout the employment tenure (Jokisaari & Nurmi, 2009); theories of relationship development and the liability of newness both argue for the change in supervisor support over time (Jokisaari & Nurmi, 2009). That is, support from supervisors tends to weaken over time for several reasons: first, the ability of supervisors to provide high-level support over time might be limited by the supervisor's own workload; second, supervisors who are highly supportive over an extended period of time may compromise their own performance; and third, compared with the relations between people similar in role and status, the relationships that span work roles and differ in status, such as supervisor-subordinate relationships, decay more rapidly because the asymmetry in power may produce social distance and constrain the development of trust and ease of communication (Jokisaari & Nurmi, 2009). Even though extraverts are likelier to build positive relationships with supervisors, the rewards-oriented motivation to achieve perspective dictates that their desire to continuously exert effort to maintain such relationships depends on whether the relationships result in valued outcomes. That is, from the motivational perspective, it seems reasonable that extraverts will take effort to maintain or strengthen a positive subordinate-supervisor relationship only if such relationship helps them to achieve valued rewards. Moreover, once the link between effort and rewards is broken, Extraversion will no longer serve as an efficient predictor of the active building of positive relationships with supervisors. Therefore, as the benefits of supervisory support experienced by veteran employees become less critical compared to those experienced by new hires, a weakened link between Extraversion and job performance over time is expected.

In sum, not only will features of extraverts which contribute to strong performance by new hires, such as being sociable and interpreting the world through a positive lens, no longer

serve as efficient predictors of performance among veteran employees, but the feature of rewards-oriented motivation to excellence and achievement predicts an weakened Extraversion-job performance relationship over time.

Hypothesis 3: The positive relationship between Extraversion and job performance decreases with time.

The Criterion-Related Validity Dynamism of Openness to Experience

Individuals with high Openness to experience display intellectual curiosity, creativity, and flexibility in thinking (Digman, 1990). People who have high Openness to experience are also described as being imaginative, independent thinking, tolerant of ambiguity, and amenable to new ideas, experiences, and perspectives (Costa & McCrae, 2002). Openness distinguishes between people who prefer novelty, variety, and intense experience and people who prefer the familiar, routine, and traditional (McCrae, 1996; McCrae & Costa, 1997). Accordingly, in the organizational context, employees who have high Openness to experience tend to appreciate the merits of new ways of doing things and are more willing and able to generate new ideas that improve or change the status quo. Alternatively, individuals with low Openness are more conservative and prefer ideas and things that are conventional rather than those that are novel and unique (Digman, 1990). However, most meta-analytic research has failed to support a positive correlation between Openness and job performance across broad occupational categories (Barrick et al., 2001). For example, Barrick and Mount (1991) reported a meta-analytically derived correlation of -.02 between Openness and job performance pooled across six occupational groups. In a second-order meta-analysis, Barrick and his colleagues (2001) indicated that, out of the five personality factors, Openness to experience exhibited the lowest true score correlation with performance across criteria and occupational groups.

Despite the generally weak relationship between Openness to experience and job performance, employees with higher levels of Openness are expected to perform better when they work in an environment where adaptation to change is needed, especially when the efficient adaptation involves developing different and possibly counterintuitive ways of doing things (Tett et al., 1991). This is because Openness to experience is associated with such characteristics as creativity and broadmindedness, prerequisites of efficient adaptation to change, which contribute to the focus of attention on areas that others may not consider (LePine, Colquitt, & Erez, 2000). The results from several experimental and field studies support the positive relationship between Openness and performance in a changing environment. LePine and colleagues (2000) found that Openness helped a sample of undergraduates adapt to changing task demands in a computerized decision-making study, as individuals with higher levels of Openness were better at adapting their decision-making and problem-solving heuristics to changing situational cues. Judge and colleagues (1999) also identified that Openness was positively related to managers' ability to cope with various organizational transitions because Openness-oriented individuals' preferences for novel stimuli increased their ability to think flexibly. Accordingly, Openness is expected to positively influence performance when employees are in a transitional stage, such as at the start of a new job (Thoresen et al., 2004).

Other than its potential to serve as a useful predictor of performance in a changing environment, Openness is also closely related to job performance in workplaces where intensive learning is required. Research shows that curiosity and engagement in intellectual pursuits, characteristics of open individuals, often reflect positive attitudes toward learning, the requisite attributes in the learning environment. Openness has been found to be positively related to training proficiency (Barrick & Mount, 1991; Hurtz & Donovan, 2000), performance in multi-

stage training programs (Herold, Davis, Fedor, & Parsons, 2002), and intellectual performance (Staudinger, Maciel, Smith, & Baltes, 1998). Open individuals are more likely to be willing to engage in learning experiences and benefit from training (Borgatta, 1964; Hakel, 1974; Costa & McCrae, 1985). Openness is also expected to influence learning and link to higher job performance from the perspective of intrinsic motivation. Individuals high in Openness, due to their tolerance of ambiguity and excitement about new ideas and experiences, are more likely to engage in the learning environment for the sake of the experience of learning (i.e., high intrinsic motivation) (George & Zhou, 2001). Research shows that individuals who are high in intrinsic motivation and free from extraneous concerns are more likely to explore new cognitive pathways, to stay focused on the internal nature of the task, and to work longer on an idea or a problem (Oldham & Cummings, 1996). Moreover, existing literature shows that intrinsically motivated individuals not only enjoy engaging in effortful thinking but are also more likely to self-enforce and regulate their behaviors. Intrinsically motivated individuals often exhibit higher self-efficacy and expectations of success. Accordingly, Openness has been found to be associated with a tendency to try to learn something valuable from taxing experiences in terms of personal growth or other positive outcomes (Costa & McCrae, 1992; Goldberg, 1993; John, 1990). Out of the Big Five, Openness exhibited the highest correlation with motivation to learn (.23) (Major et al., 2006), and Openness is expected to function as a consistent and efficient predictor of job performance in positions that require continuous learning and frequent updating of skills.

Openness is argued not only as a measurement of motivation to learn but also ability to learn because Openness to experience, of the five personality dimensions, shows the highest correlation with the measures of cognitive ability (McCrae & Costa 1987). McCrae (1993)

reported a significant correlation between the Openness to experience factor and the Wechsler Adult Intelligence Scale (see also Ackerman, 1996: Ackerman & Heggestad, 1997; McCrae & Costa, 1985; Rolfhus & Ackerman, 1996). Consistent with such prediction, Thoresen and colleagues (2004), using a sales representatives sample from a large pharmaceutical company, found that Openness exhibited a positive association with both average performance and performance trends when there is a high demand for information processing and acquisition. As employees need to learn a lot when they are new to a job, the personality trait that facilitates both the motivation to learn and the ability to learn is expected to exert a positive effect on job performance among new hires. Research has shown the critical role of learning and knowledge acquisition in a newcomer's making sense of and successful transition to a new situation (cf. Bauer et al., 2007; Chao, O'Leary-Kelly, Wolf, Klein, & Gardner, 1994; Louis, 1980; Kammeyer-Mueller & Wanberg, 2003; Klein & Weaver, 2000; Morrison, 1993; Ostroff & Kozlowski, 1992). Indeed, seminal work on newcomer socialization (e.g., Feldman, 1981; Fisher, 1986; Louis, 1980; Schein, 1971; Van Maanen & Schein, 1979) has repeatedly emphasized the learning aspect of the socialization process among newcomers.

As per stress coping, due to their tendency to engage in the continuous modification of the elements of work context to incessantly improve their job environment, open individuals are more likely to adopt a flexible, imaginative, and intellectually curious approach when dealing with stressful situations (Watson & Hubbard, 1996). The elements of work context that have been changed for the better by creative minds include task objectives, working methods and procedures, and the allocation, coordination, and assignment of tasks. Through these changes (e.g., developing useful and new ideas on work procedures), influencing and creating the situations in which they and fellow employees work allow open employees to experience job

satisfaction along with control over and identification with their jobs and with the activities going on around them. Moreover, the perception of an insider status, which is, in part, a function of the extent to which someone perceives that they are making positive contributions to the workplace, is often enhanced. That is, demonstration of creative skills and abilities usually positively influences individuals' feelings as valuable members of the organization and indirectly contributes to their job performance.

In sum, research has directly or indirectly suggested the importance of Openness with respect to its positive influences on job performance, especially in the early years of employment, as it helps individuals adapt to change, learn, and cope with stresses to meet the requirements of a new job (Ashford, 1986; Gerhardt, Ashenbaum, & Newman, 2009; Gruman, Saks, & Zweig, 2006; Kammeyer-Mueller & Wanberg, 2003; Miller & Jablin, 1991; Morrison, 1993; Mortimer & Simmons, 1978).

The positive correlation between Openness and job performance was not expected to be consistent throughout the employment tenure but instead weaken as employees' organizational tenure increased. That is, Openness might no longer function as an efficient predictor of job performance among employees who stay with the organization for a while, especially after holding the same positions for an extended period of time. Such expectation is primarily based on the main characteristics of Openness: the motivation to learn, the ability to learn, and the ability to adapt to change. Whereas these traits often contribute to the performance of new hires who need to fit into a new environment and learn job skills and knowledge, the performance of veteran employees would not benefit from these traits as much because veteran employees have already found a place in the work environment and mastered job skills and knowledge. Following the same line of reasoning, the close relationship between Openness and learning goal

orientation also explains the weakened relationship between Openness and job performance among veteran employees. Out of the Big Five traits, Openness has shown the most significantly positive correlation with learning goal orientation (.44) (Payne et al., 2007). Individuals high in learning goal orientation often focus on developing competence by acquiring new skills. Correspondingly, with the primary concerns of task mastery and learning, high learning-oriented individuals are more likely to interpret mistakes as feedback for developing strategies (Dweck, 1986; Dweck & Leggett, 1988; Martocchio, 1994; McCall, Lombardo, & Morrison, 1988; Steele-Johnson, Beauregard, Hoover, & Schmidt, 2000; Yeo & Neal, 2004), engage in deep processing (Colquitt & Simmering, 1998; Fisher & Ford, 1998; Mangos & Steele-Johnson, 2001; Steele-Johnson et al., 2000), devote more effort to on-task activities (Fisher & Ford, 1998; Kozlowski, Gully, Brown, Salas, Smith, & Nason, 2001; VandeWalle et al., 1999, 2001), and seek challenging situations (Sujan, Weitz, & Kumar, 1994). Though these traits associated with learning goal orientation often lead to higher performance, such positive links may be only applied to new hires and would not generalize to veteran employees, as the learning requirements are significantly decreased compared to those for newcomers.

The weakened Openness-job performance correlation is also expected from the perspective of another characteristic of open individuals: continuously seeking new and better ways of doing things. Though actively searching for innovative approaches to replace existing methods, arguably, might result in improved performance over time, especially in workplaces characterized by rapid change where specification of the anticipated behaviors in advance is limited if possible, such workplaces are not typical; on the contrary, the work carried out in most workplaces is quite routine, established, and predictable. Therefore, Openness-oriented employees do not have many chances to change the status quo or experiment with new

procedures. Moreover, the environmental constraints imposed on open individuals which prevent them from experimenting with creative ideas might frustrate open individuals, who have the tendency to try new things, and consequently hinder their job performance, more so than their less open counterparts.

In sum, the characteristics of open individuals, such as their continuous motivation and ability to learn, might facilitate only new hires' adaptation to their working environments and not contribute to the performance of veteran employees. Altogether, I predict that

Hypothesis 4: The positive relationship between Openness to experience and job performance decreases over time.

The Criterion-Related Validity Dynamism of Agreeableness

Individuals who are highly agreeable tend to be more cheerful and talkative, good natured, friendly, cooperative, and generally more flexible, caring, and courteous (Costa & McCrae, 1992; Goldberg, 1992; Graziano & Eisenberg, 1997; Mount & Barrick, 1995; Peabody & Goldberg, 1989). At the same time, individuals low in Agreeableness are more manipulative, cynical, and self-serving (Costa & McCrae, 1995).

Research argues that Agreeableness stems from the temperamental self-regulatory system, involving control abilities such as anger regulation and cognitive inhibition (e.g., Ahadi & Rothbart, 1994), and consistently supports that the characteristics of Agreeableness reflect individuals' strong desire to get along with others (Hogan & Holland, 2003; Wiggins & Trapnell, 1996). Specifically, through a series of laboratory studies, researchers found that agreeable individuals experienced heightened emotion in situations critical to the formation of relationships (Tobin, Graziano, Vanman, & Tassinary, 2000). Additionally, when confronted with conflict, agreeable individuals tend to generate positive perception and attributions to otherwise

provocative behavior and select more constructive, rather than destructive, tactics to handle disagreement (Jensen-Campbell & Graziano, 2001). Accordingly, agreeable individuals are often strongly motivated to maintain interpersonal harmony and acceptance as well as minimize the negative effects of interpersonal conflict (e.g., Graziano, Jensen-Campbell, & Hair, 1996; Jensen-Campbell & Graziano, 2001; Taylor, Kluemper, & Mossholder, 2010). As a result, due to their emphasis on interpersonal relationships (Graziano et al., 1996) and strive for communion (Barrick et al., 2002), agreeable employees often have more friends and establish positive relationships with coworkers or team members (Graziano, Hair, & Finch, 1997; Graziano, Habashi, Sheese, & Tobin, 2007). Research has consistently shown the high predictive validity of Agreeableness in teamwork (e.g., Barrick et al., 2003; Mount, Barrick, & Stewart, 1998; Peeters, Van Tuijl, Rutte, & Reymen, 2006) and Agreeableness may be the single best personality predictor for performance in team settings (Barrick et al., 1998; Mount et al., 1998), especially when the individual-level criterion of teamwork includes cooperativeness with coworkers and team members (Hough, 1992). One benefit of having positive interpersonal relationships with coworkers is social support (e.g., Cunningham & Barbee, 2000; Watson & Hubbard, 1996). Social support, either in the form of affective support (e.g., friendliness) or instrumental support (e.g., task-directed helping), is extremely helpful to new hires, as social support often buffers the effects of stressful events, thereby decreasing the adverse effects of stressors on one's job attitudes (e.g., Terry, Nielsen, & Perchard, 1993; Morrison, 2004; Simon, Judge, & Halvorsen-Ganepola, 2010) and increasing job satisfaction, which, in turn, leads to higher job performance (Chiaburu & Harrison, 2008).

Other than facilitating the establishment of positive interpersonal relationships, Agreeableness makes a particularly strong contribution to successful transitions among new hires

by enabling them to obtain trust from their coworkers and customers (Thoresen et al., 2004). Some major facets of Agreeableness—such as trust (i.e., the tendency to attribute benevolent intent to others), altruism (i.e., selflessness and concern for others), compliance (i.e., the willingness to cooperate), and tender-mindedness (i.e., the tendency to be guided by feelings of sympathy in making judgments and forming attitudes) — all predict the high chances for agreeable individuals to establish trusting relationships with others. Additionally, agreeable individuals are often other-oriented, valuing and experiencing concern for the well-being of others (De Drew & Nauta, 2009; Grant & Wrzesniewski, 2010; Meglino & Korsgaard, 2004). Research indicated that other-oriented employees are motivated to take actions that contribute to the well-being of others and of the organization (Grant & Mayer, 2009; Moon, Kamdar, Mayer, Takeuchi, 2008; Rioux & Penner, 2001), even when doing so requires them to face negative feedback that threatens their ego and self-image (Korsgaard, Meglino, & Lester, 1997; Moon, 2001). Accordingly, other-orientation, by fostering feelings of concern for others, increases individuals' chances to build trust in others. Agreeable individuals also prescribed to high prosocial values, regarding protection and promotion of the welfare of others as important guiding principles in life (e.g., Caprara, Alessandri, DI Giunta, Panerai, & Eisenberg, 2009; Schwartz & Bardi, 2001). Employees with strong prosocial values care about doing work that has a positive impact on others. As a result, these employees are likely to display enhanced efforts to express and fulfill their values of benefiting others. Empirical studies found that Agreeableness was positively related to both mean performance and performance growth in terms of sales volume among employees going through a transitional stage in their employment, a stage when the methods of operation are undefined and the employees need to familiarize themselves with job-specific demands (Thoresen et al., 2004). Research explained that,

consideration and cooperation, characteristics of agreeable persons (Costa & McCrae, 1995), increase individuals' ability to initiate contact and to gain access to potential customers (Thoresen et al., 2004).

In sum, Agreeableness is expected to contribute to higher job performance among new hires due to its core traits, such as being caring and collaborative, which often facilitate positive and trusting relationships with others, and enable newcomers to access social support and potential customers, ultimately helping them to achieve higher job performance in early employment.

Though agreeable individuals' exhibition of high willingness to cooperate and facilitate others' work—especially at the late stage of one's career, when they have successfully secured their positions and established reputations in the organization—often reflects their high level of job satisfaction and organizational commitment, the link between Agreeableness and job performance among veteran employees was not expected to be as strong as that in the early stage of employment, when establishing positive relationships and receiving social support were particularly influential on the performance of new hires. Even though from the perspective of personality trait and information processing, agreeable individuals who are especially sensitive to interpersonal stimuli and pay special attention to the information related to communion are more likely to establish positive relationship with others, employees lower in Agreeableness will have opportunities to develop social support and informal networks in the work environment over time. Moreover, the benefits associated with positive interpersonal relationship for the new hires might not generalize to the veteran employees. Research further argues that employees in late stages of employment, who prioritize the maintenance of interpersonal harmony and acceptance and are compliant to demands from customers, peers, and supervisors, might have difficulty

obtaining the necessary resources to achieve strong job performance, even though successful cooperation and interaction in the workplace is vital to organizational success (Mount et al., 1998).

Research also showed that the contribution of Agreeableness to performance over time, if there is any, might be cancelled out by the increases in motivation to maintain interpersonal harmony and acceptance as well as to minimize the negative effects of interpersonal conflicts, the prominent features of agreeable individuals, as people get older. Specifically, Warr (2001) found that older individuals were more agreeable than younger individuals, and Maehr and Kleiber (1981) found evidence for age-related increases in generativity and affiliation motives. That is, older workers prioritize emotionally meaningful goals, and age showed to be positively associated with the motive strength related to helping other people and contributing to society (Kooij et al., 2010). Research also showed that older adults were more likely to regulate their mood with more cheerful interpretations of conflict situations (Chapman & Hayslip, 2006) and exhibit much less hostility and anger than younger adults (Barefoot, Beckham, Haney, Siegler, & Lipkus, 1993). These findings were consistent with Socio-Emotional Selectivity Theory's (Carstensen, 1995) prediction that as older adults start recognizing the time limitation, they tend to optimize emotional meaning in their lives, maximizing positive interactions and minimizing negative encounters with others. Therefore, both tenure- and age-related perspectives suggest that

Hypothesis 5: The positive relationship between Agreeableness and job performance decreases over time.

CHAPTER 3

METHOD

This chapter specifies (1) criteria that define the population of study under investigation; (2) search strategies to identify and retrieve eligible studies; (3) definitions and measures of key constructs of this paper (i.e., personality trait, job performance, and temporal variables); (4) moderators (i.e., job complexity, global vs. composite performance measures); (5) issues related to meta-analysis, such as methods, sample size, effect size calculation, attenuation correction, outliers, and publication bias; and (6) method for handling missing information for variables, such as work style, temporal variables, reliability information for personality and performance measures, and job zone.

Inclusion Criteria

For studies to be included, five criteria need to be met. First, studies need to use incumbents, applicants, or job trainees as research participants. Second, studies need to adopt personality measures that were constructed with the Big Five as the conceptual basis or were successfully reinterpreted in terms of the FFM (cf. Conn & Rieke, 1994; Jackson, Paunonen, Fraboni, & Goffin, 1996; Marcus et al., 2007). Third, studies need to explicitly measure job performance. Fourth, studies have to report time-related variables such as age, work experience, or organizational tenure[2]. Fifth, studies need to report the correlation between personality trait and job performance. When the study only reported the regression coefficients of the Big Five traits as predictors of job performance, such paper was excluded from meta-analysis (e.g., Law, Wong, & Song, 2004; Robie & Ryan, 1999; Sanders, 2008).

[2] The proposed meta-analysis can be carried out with one of two different methods: (1) with a set of longitudinal studies reporting multiple effect sizes between personality and job performance across different time points over employment tenure, or (2) with studies reporting temporal variables. As the number of studies of the first kind is very limited (Thoresen et al., 2004; Stewart, 1999), I decided to focus on the studies reporting temporal variables.

Literature Search

The search for potential studies for the meta-analysis involved three major steps. First, a keyword search was conducted with computerized databases that contained research studies pertinent to industrial/organizational (I/O) psychology, management, organizational behavior, and personality psychology: ABI/INFORM, Business Source Complete, Emerald Management 140, ERIC, Google Scholar, PsycINFO, and Web of Science. Keywords for the predictor variables included personality, Big Five, FFM, Openness to Experience, Conscientiousness, Extraversion, Agreeableness, Neuroticism, Emotional Stability, positive affect(ivity), negative affect(ivity), affect, affectivity, disposition, and anxiety. Keywords for the criteria included job performance and supervisory ratings. Next, the references from prior meta-analyses investigating the relationships of interest in this paper were used (e.g., Dudley, Orvis, Lebiecki, & Cortina, 2006; Hurtz & Donovan, 2000; Meyer et al., 2009). Finally, a manual search of the following thirteen top management and human resources journals from 1999-2010[3] was performed: *Academy of Management Journal, Human Performance, International Journal of Selection and Assessment, Journal of Applied Psychology, Journal of Management, Journal of Occupational and Organizational Psychology, Journal of Occupational Psychology, Journal of Organizational Behavior, Journal of Personality and Social Psychology, Journal of Vocational Behavior, Organizational Behavior and Human Decision Processes, Personnel Psychology,* and *Psychological Bulletin*.

[3] The reason to conduct a manual search of these journals started from 1999 was because the major meta-analytic paper (Hurtz & Donovan, 2000) on the personality trait-job performance relationship conducted its manual search in journals until 1998.

The final data set included 150 independent samples[4] extracted from 118 papers (74 samples for Openness, 123 for Conscientiousness, 99 for Extraversion, 85 for Agreeableness, and 94 for Neuroticism). Appendix A provides the list of primary studies used in the meta-analyses and Appendix B summarizes the major characteristics across primary studies, such as author, year of publication, journal, sample size, participants' occupation, age, organizational tenure, the correlations between each personality trait and job performance, and the specific personality measures adopted by each study.

Definitions and Measures of Key Constructs

Differences in construct definitions and measures (i.e., one construct might be related to different definitions and various measurement methods) across primary studies used for meta-analysis often influence the distributions and covariances of the effect sizes and consequently compromise the results of meta-analysis (Bobko & Roth, 2003). Therefore, the definition and the measure of each key construct in this meta-analysis—personality trait, job performance, and temporal constructs such as age, work experience or organizational tenure—were clarified as follows.

Personality Traits

Definition of Personality

The universal definition of personality is often debated (Saucier & Goldberg, 2003). Nevertheless, two major themes seem to pervade nearly all efforts at personality theorizing:

[4] In this meta-analysis, "sample" refers to a subset of cases selected from a population. To put the usage of this term in the context, for example, each primary study used for the meta-analysis will have different samples in terms of the cases selected for that particular primary study. These terms, "study," "paper," and "sample" might be used interchangeably in some places. Basically, one "study" or one "paper" might use several samples; at the same time, the same sample can be used in different papers. Only one effect size from each sample was used for the meta-analysis to control for independency between effect sizes.

human nature and individual differences (Buss, 2008). Human nature is comprised of the universal or nearly universal characteristics of humans, such as the shared motives, goals, and psychological mechanisms. Individual differences focus on identifying the most important ways in which individuals differ across these universal dimensions of human nature. A definition comprised of these two major overarching themes referring to personality as the dispositions or traits that predispose people to think and behave in a certain way across time and situations (Johnson, 2003; Saucier & Goldberg, 2003) was used in this paper. Such definition simultaneously summarizes characteristics of personality, namely that it is ascribed to individuals, consistent over time, and psychological in nature.

Measures of Personality Traits

The Five-Factor Model (FFM) of Personality ('Big Five') is one valuable tool for organizing personality measures at a descriptive level (Funder, 2001; Hough, 1997; Mount & Barrick, 1995; Rothstein & Jelley, 2003). Studies adopting personality measures either explicitly designed from the inception to measure the Big Five (i.e., FFM-based personality measures) or later successfully reinterpreted in terms of the FFM (i.e., non FFM-based personality measures) were both included in order to reach a larger sample size for the meta-analysis and to investigate the effects of different personality measures on the personality trait-job performance relationship (Salgado, 2003). A total of 25 distinct measures of the Big Five traits have been used across 150 samples (refer to Appendix C for a list of personality measures across primary studies).

In addition to the differences in personality measures with respect to the choice between FFM and non FFM-based personality measures, personality measures across studies also differ in rating sources. Other than the common practice, which asks study participants to rate their own personality traits, some research obtained participants' personality trait scores from

coworkers (e.g., Kamdar & van Dyne, 2007), spouses (Shaffer, Harrison, Gregersen, Black, & Ferzandi, 2006), or supervisors (Hui, Pak, & Cheng, 2009).

Standard personality measures were also revised by researchers due to various reasons, such as time constraints, criticism of the existing form, or interest in comparisons of the answers in the general context with those in the work environment. For example, because of the time constraints imposed on the researchers from the participating organization, Mount and his colleagues (1994) shortened the Goldberg's Big Five Markers (1992) from 100 adjectives to 50, keeping the items with the largest factor loadings reported by Goldberg (1992). Intending to improve the measures on positive affectivity with PANAS, authors added several items to the standard form (Tsai, Chen, & Liu, 2007). Additionally, some researchers preferred to focus on the effect of participants' personalities on their job performance rather than on daily life and thereby added instructions to the standard form, such as asking the test participants to only think about their behaviors at work (Small & Diefendorff, 2006). Also, the scales adoption within the same personality measure might vary across studies. For example, for the PCI measures, Burke and Witt (2002) used the three-point Likert-type scale (from 1= "disagree" to 3= "agree"), whereas Mount and his colleagues (2009) adopted the five-point Likert-type scale (from 1= "strongly disagree" to 5= "strongly agree"). Similarly, Wright and his colleagues (Wright, Kacmar, McMahan, & Deleeuw, 1995) modified the PRF personality measure (Jackson, 1984) by expanding the True/False response categories to a four-point scale consisting of the choices of Very True, True, False, and Very False.

In sum, variations in personality measures can be summarized into six categories: FFM vs. non-FFM based measures, self-rating vs. others-rating, differences in the length and the scale

adoption of personality trait test, elimination and addition of certain items to the standard form, and work context vs. general personality test.

Decisions on Special Situations Relating to Personality Traits Measures

In order to minimize the chance that the changing personality trait-job performance correlation was due to factors other than time-related variables, I tried to homogenize the characteristics across the samples whenever possible. For example, in the samples adopting other-rating on personality trait from both supervisor and other peer groups, the correlation between personality trait and job performance rated by supervisor was adopted (Mount et al;, 1994) because the majority of samples used supervisory ratings on job performance.

Some special personality measure-related situations and the corresponding decisions are listed here: (1) when the researchers asked the participants to rate their personality traits with different measures, the measure that was used most often in the personnel selection context was used to calculate the mean effect size. For example, when the study adopted two personality measures, one general measure (e.g., 16PF) and one occupational-specific measure (e.g., Accountant Personality Fit Scale), the general measure was used to compute the mean effect size (Jenkins & Griffith, 2004); when the study reported personality scores in both PRF measure and 16PF measure (Marcus, Goffin, & Johnston, 2007), 16PF was used; similarly, when the paper (Bergner, Neubauer, & Kreuzthaler, 2010) used three different personality measures, NEO-FFI, BIP, and AMI, the correlation between NEO-FFI and job performance was used to calculate the mean effect size across all the studies; (2) when both Extraversion and positive affect was reported and Extraversion were measured by the FFM-based measure (e.g., NEO-FFI) whereas positive affect was measured by a less commonly used measure (e.g., Affectometer 2 (AFF2)), only the relationship between Extraversion and job performance was used to compute the mean

effect size (Deluga & Masson, 2000); and (3) when the author reported the correlation between the composite of personality measures (i.e., an average over two or three dimensions of the Big Five), the authors were contacted through email to obtain the correlation between each Big Five trait and job performance. Such procedure generated one paper for meta-analysis (Blickle, Meurs, Schneider, Kramer, Zettler, Maschler, Noethen, & Ferris, 2008).

Job Performance

Definition of Job Performance

The definition of job performance used in this paper emphasizes the behaviors that are under the control of the individuals and contribute to the goals of organization (e.g., Campbell, 1991; Campbell, McCloy, Oppler, & Sager, 1993).

Measures of Job Performance

The concerns of the selection context as well as the requirement of the match in the level of measurement specificity led us to concentrate on the overall performance measure. This meta-analysis included a wide range of performance measures across the studies (refer to Appendix D for a list of performance measures across primary studies). These overall performance measures can be summarized into six broad categories. First, overall job performance rating is comprised of several performance dimensions, either developed based on the job analysis for specific organizations (e.g., Colbert & Witt, 2009) or adopted from the existing measures (e.g., Bauer, Erdogan, Liden, & Wayne, 2006). Out of the samples within this category, there were some variations: (a) the number of items used to measure these performance dimensions varied from three items (e.g., Conte & Jacobs, 2003) to eighteen items (e.g., Mount et al., 1999); (b) the scores on these performance dimensions were either equally weighted and combined into a composite score, therefore reporting a single correlation between each

personality trait and the composite score, or the correlations between each individual personality trait and each performance dimension was reported; and (c) out of these performance dimensions, some exclusively focused on task performance; some included both contextual performance and task performance; some considered adaptive behavior, counterproductive workplace behavior, and safety behavior in addition to contextual performance and task performance; and others used employee performance on one or several critical aspects of the job to represent the overall job performance. Second, overall performance rating was not based on individual dimensions but on global performance rating. That is, rather than providing evaluation on each performance dimension, the rating was based on one or several very broad items. A typical one-item overall rating can be: "overall, considering the employee's performance in the full range of day-to-day activities, as well as his or her overall contribution to the organization, its customers, and its employees, he or she performs …" (e.g., LaHuis, Martin, & Avis, 2005). Some researchers only reported the correlations between personality trait and overall performance rating, and some provided correlation information between personality trait and each performance dimension in addition to that between personality trait and overall performance rating. Third, overall performance rating was based on objective data, such as sales volume and/or 'sales target met.' Some studies reported ratings on performance dimensions (e.g., customer service quality) in addition to the objective performance (e.g., Witt, Andrews, & Carlson, 2004). Fourth, overall performance rating was represented by the scores on assessment center exercises (Lance, Foster, Nemeth, Gentry, & Drollinger, 2007; Perkins & Corr, 2006). Fifth, performance score was based on training performance (e.g., Cellar, Miller, Doverspike, & Klawsky, 1996; Cortina, Doherty, Schmitt, Kaufman, & Smith, 1992; De Meijer, Born, Terlouw, van der Molen, 2008). Lastly, when participants of studies came from a wide range of industries

or held a variety of positions, either the sum score on performance dimensions relevant to all positions (e.g., Witt & Calson, 2006) or the average score obtained over performance dimensions critical to satisfactory job performance for particular positions was used to represent the overall performance score (e.g., Kieffer, Schinka, & Curtiss, 2004).

In addition to these variations in overall job performance measures across the studies, some other differences pertaining to job performance measures include the rating sources (e.g., supervisor- versus others-rated performance measures) and rating purposes (e.g., research- versus administration-based performance measures).

Decisions on Special Situations Relating to Job Performance Measures

Strategies used to minimize the effects from the personality measure-related variations across the primary studies on the personality trait-job performance correlation were also applied to the performance measure-related variation. For example, even though most studies included in this meta-analysis adopted either global or composite performance rating, when a study reported both ratings (e.g., Barrick & Mount, 1993; Wright & Staw, 1999), the correlation between personality trait and composite score was used to calculate the overall effect size, as most primary studies adopted composite rating. Likewise, the correlation between personality trait and subjective (rather than objective) performance ratings as well as the correlation between personality trait and supervisory rating (rather than self-rating, peer-rating, subordinate-rating, or customer-rating) were used to estimate the overall effect size.

Some special performance measure-related situations and the corresponding decisions are listed here: (1) when the primary study reported the correlations between personality trait and maximum performance rating as well as typical performance rating, the correlation with typical performance was used for mean effect size calculation (e.g., Marcus et al., 2007; Ployhart, Lim,

& Chan, 2001); (2) when the primary study reported the correlations between personality trait and adaptive performance as well as task performance, the correlation with task performance was used for mean effect size calculation (e.g., Griffin & Hesketh, 2004); (3) the peer and supervisor nomination or ranking was treated as global performance rating (Ramo, Saris, & Boyatzis, 2009); (4) when service performance, absenteeism, and intent to turnover were used to assess employee performance, the service performance was used to represent the overall performance (Sawyerr et al, 2009); (5) the primary studies examining the relationship between the Big Five and one specific aspect of the job performance (e.g., Tsai et al., 2007) were excluded from the meta-analysis, except for those studies where the authors explicitly specified that the performance of that particular behavior constituted the critical aspect(s) of the overall job performance and was highly regarded by the organization (e.g., Grant & Wrzesniewski, 2010); and (6) studies using criteria such as participants' yearly income and the number of promotions achieved at the current employment as the measure of job performance (Bergner et al., 2010) were excluded from meta-analysis.

Temporal Variables

Definition of Temporal Variables

Commonly used time-related variables include age, work experience, and organizational tenure. Age refers to the age in years of the participants in the sample. Work experience refers to the length of employment in specific job roles, accumulated across organizations (Quinones, Ford, & Teachout, 1995; Schmidt, Hunter, & Outerbridge, 1986; Sturman, 2003). Organizational tenure refers to the length of employment in one particular organization, accumulated across positions within that organization (e.g., Ng & Feldman, 2010; Sturman,

2003). These time-related variables were often positively correlated and used interchangeably (Sturman, 2003)[5].

Measures of Temporal Variables

As the focus of the study was to examine how the efficiency of personality traits as predictors of job performance changes over employment tenure, commonly reported time-related variables, such as age, work experience, or organizational tenure, whichever were available in the sample, were coded. The decision of coding each of these three time-related variables was for three reasons: (1) to capture a larger sample size, (2) to identify the correlations among these time-related variables in order to substitute the missing information for any particular temporal variable in the sample, and (3) to identify one time-related variable, the change in which over time will best reflect the changes in the job demands with respect to work motivation, stress coping, socialization behavior, and learning behaviors, ultimately capturing performance dynamism.

Decisions on Special Situations Relating to Temporal Variables Measures

Some issues relating to the measurement of time-related variables were identified and handled on a case-by-case basis: (1) when the study simply reported the age information without specifying whether it referred to the mean age or the median age, the age information was treated as median age; (2) when the study did not provide information on participants' organizational tenure but mentioned that the performance rating was based on actual sales data over a certain period of time, that period of time was used as the organizational tenure (e.g., Hattrup, O'Connell, & Wingate, 1998); (3) when the study participants came to the assessment center to

[5] Sturman (2003) reported a mean job experience of 5.64 years (SD = 4.01 years) with a range between .67 years and 22.04 years (based on 86 samples with a total of 84,173 participants); a mean organizational tenure of 7.72 years (SD = 4.87 years) with a range between .22 years to 19.16 years (based on77 samples with a total of 56,664 participants); a weighted mean age of 35.50 years (SD = 7.35) with a range between 17.40 years and 64.00years (based on 155 samples with a total of 94,290 participants).

evaluate their potential, either for selection or developmental purposes, the interval between their completion of the assessment and the collection of their performance effectiveness feedback was coded as work experience (de Hoogh, den Hartog, & Koopman, 2005); (4) when the participants were trainees (e.g., Cellar, Miller, Doverspike, & Klawsky, 1996), the duration of the training course was used as the measure of work experience; (5) when the age or work experience information of the hotel service employees (i.e., food preparation, food service, housekeeping, golf course maintenance, and cashier services) was missing (Stewart & Carson, 1995), an industry average, obtained through the website of the Bureau of Labor Statistics (BLS), was used to substitute for the missing information; (6) when the paper reported performance rating for two different time periods, a composite score was calculated. Also, a composite score was calculated when the sales performance over different time points was reported (e.g., Thoresen et al., 2004); (7) when the sample was recruited through various forms of media (e.g., telephone, newspaper, radio, email) and consisted of participants from a wide range of occupations (e.g., from childcare workers to professors) (Fisher, 2003), the average age or work experience obtained over the primary studies was used; (8) when the primary study reported two time-related variables, either of which could be referred to as work experience or organizational tenure, the larger of the two numbers was arbitrarily treated as work experience and the smaller of the two as organizational tenure when the attempt to clarify with the author failed; and (9) when the authors mentioned that they had collected information on the time-related variables yet such information was not reported in the publication, the authors were contacted through email to request for the missing information. Such procedure generated two papers (Anderson, Spataro, & Flynn, 2008; O'Connell, Hartman, McDaniel, Grubb III, & Lawrence, 2007).

Moderators

In order to minimize the possibility that the variation in the personality trait-job performance correlation across primary studies might be due to factors other than the differences in such temporal variables as age or organizational tenure, this meta-analysis controlled for the moderators as described in the following paragraphs[6].

Job Complexity

Definition of Job Complexity

Job complexity, usually defined as a gross index of a job's cognitive demands (Murphy, 1989), has functioned as an important situational variable on the personality trait-job performance relationship (e.g., Barrick et al., 2003; Conway & Huffcutt, 1997; Harris & Shaubroeck, 1988; Johnson, 2003; Sturman, 2003; Tubre & Collins, 2000). Some researchers argue that personality traits and job complexity are connected because job complexity is related to stress and personality traits predict individual differences in stress-coping strategies (Connnor-Smith & Flachsbart, 2007). Others suggest that personality traits and job complexity are related because job complexity is usually associated with greater discretion or autonomy, which implies a more flexible work environment with greater challenges and motivational and emotional demands (Barrick et al., 2003). This paper meta-analytically examines how the differences in the level of job complexity affect the personality trait-job performance relationship.

Measures of Job Complexity

One common measure of job complexity is categorizing jobs as either "low complexity" or "high complexity" based on general intelligence, verbal ability, and numerical ability required to perform the job (e.g., Ng & Feldman, 2010; Wood, Mento, & Locke, 1987). Examples of

[6] The constraints from data availability prohibited us from simultaneously controlling for all the potential effects other than the temporal variables on the personality trait-job performance correlation.

"high complexity" jobs are accountants, engineers, and IT professionals. "Low complexity" jobs include clerks, restaurant workers, and receptionists. Another measure of job complexity is adopting the "job zone" information provided by O*NET as a measure of job complexity. Job zone is one piece of information along with knowledge, skill, and ability for each occupation included in O*NET (Converse, Oswald, Gillespie, Field, & Bizot, 2004). All of the occupations in O*NET are categorized into one of five job zones with respect to the different requirements in the education, related experience, and on-the-job training that people need to perform the job. Occupations falling in job zone 1, such as taxi drivers or waiters/waitresses, often need little or no preparation for the work and involve following instructions to help others. The occupations in job zone 2, such as customer service representatives, retail salespersons, or tellers, often involve using knowledge and skills to help others. Jobs in zone 3, such as food service manager, require the job holders to use communication and organizational skills to coordinate, supervise, manage, or train others to accomplish goals. Employees in job zone 4, such as sales manager or teacher, need considerable preparation in the form of education, related experience, and on-the job training, as these occupations involve higher levels of coordinating, supervising, managing, or training others. Jobs in zone 5, such as chief executive or scientists, require employees to apply very advanced communication and organizational skills to coordinate, train, supervise, or manage the activities of others to accomplish goals. Compared with the method of dichotomizing job complexity into either "low" or "high" categories, the approach of dividing jobs into five zones according to the differences in requirements in education, related experience, and on-the-job training seems a better measure of job complexity. Therefore, job zone was used to measure job complexity in this paper.

In order to accurately measure the job complexity level of the occupations held by participants in each primary study, two steps were applied to ensure the best match between participant occupations and O*NET jobs. First, every piece of job-related information provided by the primary study, such as job title, position description, or education level, was used to locate the most closely-matched job in O*NET. Second, detailed occupation information listed by O*NET was used as a point of comparison to relevant information of the occupations in the samples. Such procedure works well for some occupations, such as bus operators, truck drivers, or subway and streetcar operators. However, it was difficult to locate the exact position for jobs (e.g., bank employee or hotel employee) when the primary study did not give detailed job information such as major job responsibilities for these positions. For example, bank employees can take positions ranging from the entry-level clerk positions such as "tellers," "new account clerks," "statement clerks," and "loan interviewers and clerks" to some high-level positions, such as "financial specialists." Similarly, hotel service employees hold a wide range of positions, from low-level positions such as "front desk clerks," "food servers," "housekeeping," and "concierges" to median- and high-level positions, such as "lodging manager." Accordingly, the requirements to each of these positions vary greatly with respect to knowledge, skill, ability, education, job experience, and specific job zone. Mis-categorization of the positions under job title and job zone would greatly compromise the capability of detecting the moderating effect from job complexity on the personality trait-job performance relationship. As the majority of bank employees hold positions in job zone 3 and hotel employees typically in job zone 2 based on the studies in this meta-analysis, when primary studies did not provide information detailed enough to infer any specific position either in the bank or at the hotel, a job zone level of 3 was assigned to the bank employees and 2 to the hotel employees. Similarly, most studies do not

give detailed information on engineering, mechanic, and managerial positions. The same strategy as that applied to hotel and bank employees was adopted to determine specific job zone for these positions. Job zone level of 4 was assigned to the engineers and 3 to both the mechanics and managers.

Decisions on Special Situations Relating to Job Complexity Measures

Special cases were treated in the following manner: (1) when the job zone information was not given for certain positions by O*NET, the job zone information given by the most closely-related occupations was used to substitute the missing job zone information for that position. For example, O*NET provides a very brief summary about "office and administrative support workers" (43-9199.00), so job zone information given for positions such as "office clerk" (43-9061.00) or "secretaries, except legal, medical and executive" (43-6014.00) were used as substitutes. Such decision was based on two facts. First, the difference among "office and administrative support workers," "office clerk," and "secretaries" is very subtle, and employees holding these three job titles often engage in very similar work tasks. Second, the hourly median wages between "office clerks" and "office and administrative support workers" are comparable. Therefore, the job zone information for "office clerks" was used when the primary study simply describes the participants as administrative workers without further explanation about the nature of their work or detailed information about their work activities. Moreover, to ensure the accuracy of the categorization, other relevant positions such as those one level lower or higher than the focused position were used to compare for the similarities and dissimilarities in order to locate the best matched position in O*NET with job zone information; (2) for the studies adopting mixed samples, either the semi-mixed samples (i.e., jobs sharing some similarities in job responsibilities and education requirement to a certain extent) (e.g., Greguras & Diefendorff,

2010) or the total mixed samples (i.e., jobs sharing very few, if any, common characteristics) (e.g., Blickle et al., 2009; Fisher, 2003), a sample-size weighted mean score on job zone was used[7].

Global versus Composite Performance Measures

Description of Global and Composite Performance Measures

Composite performance rating refers to the score obtained through averaging or summing the scores on each performance dimension, which is developed based on the job analysis. Global performance rating is based on a much more general format, often with one score to summarize the overall performance. One line of research suggests that the use of a single global indicator item is preferred over the use of multiple items to measure overall job performance especially when it is difficult, if not impossible, to write multiple non-redundant items (Chan & Schmitt, 2002). Researchers further argue that it is ecologically valid to obtain a single-item measure of overall job performance insofar as supervisors presumably do form a summary global impression of a subordinate's job performance. Also, researchers suggest that, compared to perceptions of specific performance dimensions, the overall impression of an employee may reach higher levels of agreement among raters (Heidemeier & Moser, 2007). Another line of research suggests that personality measures predict job performance better when performance measures are developed

[7] Adopting mean substitution for the missing information on job zone is not the best strategy. I am aware of the possibility of multiple imputation (Allison, 2002; Little & Rubin, 1987; Schafer, 1999). In multiple imputation, multiple sets of new data whose coefficients vary from set to set are generated in order to capture the variability in estimates and to avoid the possibility of underestimating the standard errors by one random imputation. Multiple imputation is a better way of substituting missing data than mean substitution. However, in addition to the highly technical nature of multiple imputation as well as the absence of simple software for multiple imputation (PROC MI and PROC MIANALYZE in SAS will do it), the small percentage of studies using either semi-mixed samples (3%) or total mixed samples (5%) out of the total number of studies along with the situation that the moderating effects from job zone on personality trait-job performance correlation is not the focal interest of this paper seems justifying the decision to select the mean substitution method for missing data.

based on detailed job analysis and are composed of several different performance dimensions (Hough, 2001). Central to such moderating effect is the potential reduction in conceptual disagreement and the level of inference. This paper is the first to meta-analytically examine the extent to which the selection between global performance rating and composite performance rating influences the personality-job performance relationship.

Measures of Global and Composite Performance

Most studies included in this meta-analysis adopted either global or composite performance rating. One way to differentiate the global rating from composite rating is that the former usually does not report the measurement reliability yet the latter does.

Decisions on Special Situations Relating to Global and Composite Performance Measures

When a study reported both global rating and composite score for performance evaluation (e.g., Barrick & Mount, 1993; Wright & Staw, 1999), the correlation between personality trait and composite score was used to calculate the overall mean effect size whereas the correlation between personality trait and global rating was used for moderating effect analysis due to two reasons: (1) a much smaller number of primary studies adopted global performance rating compared to the number using composite rating; and (2) only one effect size from each sample was used for the meta-analysis to control for independency between effect sizes.

Meta-Analysis

Methods

Hunter & Schmidt's Method

Hunter and Schmidt (1990)'s method was used to meta-analytically estimate the mean personality trait-job performance correlation across studies for each Big Five dimension.

Specifically, predictor- and criterion-related measurement errors were independently corrected for each raw personality trait-job performance correlation (i.e., the correlation reported by each study). This process is to correct for the error of measurement that systematically lowers the correlation between measures in comparison to the correlation between the variables themselves. This attenuation correction process can be expressed by the following formula: $(r_{xy}) /(\sqrt{r_{xx}}*\sqrt{r_{yy}})$ (where r_{xy} refers to the raw correlation reported by study, and r_{xx} and r_{yy} refer to the reliability coefficients for predictor and criterion measure, respectively). The sample-size weighted mean correlation (i.e., correlations weighted by the sample size on which they are based), both for the uncorrected correlations and corrected correlations, were then computed. In addition to these point estimates, total observed variance, variance due to sampling error, 80% credibility intervals for the individual correlation, and 95% confidence intervals for the mean correlation were computed (Geyskens, Krishnan, Steenkamp, & Cunha, 2009).

HLM Method

The HLM method for meta-analysis (Bryk & Raudenbush, 1992; Raudenbush, 1994; Raudenbush, Bryk, Cheong, Congdon, & du Tolt, 2004) enables us to assess the consistency of study results and to formulate models to account for any inconsistencies. The HLM method requires a z-transformation for each effect measure (r correlation in this paper) before conducting any analysis and is composed of two levels of models.

z-transformation. A z-transformation enables meta-analysts to obtain the standardized effect measure (d_j) as well as to normalize the sampling distribution with a sampling variance (V_j) that can be assumed to be known in order to use the maximum-likelihood estimation procedures to analyze the data.

The formula to standardize effect measures is as follows:

$d_j = \frac{1}{2} \ln [(1 + r_j)/(1 - r_j)]$ (where j = 1, …, J (J = 74 for Openness, J=123 for Conscientiousness, J = 99 for Extraversion, J = 85 for Agreeableness, and J = 94 for Neuroticism); d_j denotes the standardized effect measure in sample j; r_j denotes the corrected personality trait-job performance correlation in sample j (i.e., the personality trait-job performance correlations that have been corrected for measurement errors both in predictor and criterion))

The sampling variance of d_j is:

$V_j = 1 / (n_j - 3)$ (where V_j denotes the sampling variance of d_j as an estimate of the corresponding population parameter; n_j denotes the sample size of study j)

Level-1 model. Level-1 model estimates the population parameter ρ_j corresponding to d_j.[8]

$d_j=\rho_j+e_j$ (d_j denotes the standardized effect measure in sample j; ρ_j denotes the population parameter estimated by d_j; e_j denotes the sampling error associated with d_j as an estimate of ρ_j and for which we assume $e_j \sim N (0, V_j)$)

Level-2 model. Level-2 model often helps meta-analysts assess the consistency of study results and evaluates how theoretical-based predictors might explain the inconsistency of study results if there is any. Specifically, Level-2 unconditional model with no predictors but only intercept (β_{0j}) involved estimates the grand mean of the effect size and a Level-2 error (η_j) as well as informs researchers the significances of inconsistency of study results included in the meta-analysis. Level-2 conditional model where both predictors and intercepts involved provides us the expected effect size in the studies with the effects from the predictors (β_{1j}, β_{2j}, β_{3j}, β_{4j}) controlled along with the expected difference in effect size for each predictor.

[8] As the major concern in this meta-analysis is how temporal variables, operationalized in age or organizational tenure, explained the significant variation in personality trait-job performance correlations across samples, I only reported the results of Level-2 unconditional model and those of Level-2 conditional model not those of Level-1 model, which estimates the population parameter of mean effect size.

Level-2 model: unconditional

$\rho_j = \beta_{0j} + \eta_j$ (where β_{0j} denotes the mean of correlation between personality trait and job performance across the samples; η_j denotes the random error at Level-2 model with a mean of zero and a variance of τ^2)

Level-2 model: conditional

$\rho_j = \beta_{0j} + \beta_{1j}X_{1j} + \beta_{2j}X_{2j} + \beta_{3j}X_{3j} + \beta_{4j}X_{4j} + \eta_j$ (where β_{0j} denotes the mean of correlation between personality trait and job performance across the samples; β_{1j} denotes the mean median age/organizational tenure of participants in sample j; β_{2j} denotes whether the participants holding positions belong to job zone 1 or 2 in sample j; β_{3j} denotes whether the participants holding positions belong to job zone 4 or 5 in sample j; β_{4j} denotes whether performance evaluation adopts global performance rating in sample j; η_j denotes the random error at Level-2 model with a mean of zero and a variance of τ^2)

Sample Independence

Only one effect size from each sample was used for the meta-analysis to control for independency between effect sizes. That is, only one effect size was used when the same sample was used in different papers. The paper with the bigger sample size or more commonly-used personality or performance measures was included in the meta-analysis when all the papers met the inclusion criteria.

When the author did not clearly specify other papers that used the same sample (e.g., Witt, Burke, Barrick, & Mount, 2002) or reported that the sample was a part of a bigger project (e.g., Witt & Ferris, 2003) yet a sample overlapping was suspected, the prominent features of the papers, such as sample size, participants' occupations, ages, job tenures, personality measures,

and performance measures were compared. The authors were contacted to confirm the suspicion.

Special situations regarding sample independence were handled as follows: (1) when participants were divided into categories based on some demographic characteristic, such as majority versus minority, and the personality trait-job performance correlations were reported under each category, the categories were treated as two different samples (de Meijer et al., 2008); (2) Barrick et al (1994) clearly specified that the 1994 study was an extension of the 1993 study yet both studies were used for meta-analysis based on three reasons: (a) the sample sizes of these two studies were different, with 91 participants in the 1993 study and 194 in the 1994 study; (b) the median age was 37 in the 1993 study and 38 in the 1994 study, and the average tenure in the organization was 10 years in the 1993 study and 8.7 years in the 1994 study; and (c) the 1993 study tested five personality dimensions, yet the 1994 study only tested one personality dimension; (3) Mount et al (1994) and Mount et al (1999_study 2) drew different samples from the same organization, and both studies were used for meta-analysis; (4) Stewart (1996) and Stewart (1999) were both used for the meta-analysis even though they used the same sample: the 1999 study only reported the correlation between Conscientiousness and job performance and the 1996 reported that in addition to the correlation between Extraversion and job performance. Furthermore, only the correlation between Extraversion and job performance reported by the 1996 study was used; (5) all the samples in Witt & Ferris (2003) were part of a larger project, which had been included in the meta-analysis; therefore, none of the samples in Witt & Ferris (2003) were used; (6) Berry et al (Berry, Page, & Sackett, 2007) and Oh & Berry (2009) used the same sample, yet only Oh & Berry (2009) was included in the meta-analysis as it adopted a better performance measurement compared to Berry et al (2007). Oh and Berry (2009) rated

each participant with 19 managerial performance competencies including both contextual performance and task performance whereas Berry et al (2007) asked raters to make a rating of overall effectiveness on a nine-point scale.

Sample Size

Sample size information is usually reported by each study. Special situations regarding sample size were handled as follows: (1) when the study reported the correlations between personality trait and a set of job performance ratings measured at different time points with different numbers of participants, due to promotions and turnover, the correlation between personality trait and job performance measured at the time point with the highest number of participants was used for calculating mean effect size (e.g., Barrick & Zimmerman, 2009; Thoresen et al., 2004); (2) when the number of participants for the personality tests was not equal to that for the job performance ratings, the smaller number was used for the sample size.

Effect Size Calculation

One effect size from each sample was used to calculate the overall mean effect size across studies. When the primary study reported the correlations between the Big Five and each job performance dimension rather than overall job performance or some equivalent measure, or the overall performance was measured at different time points, Hunter and Schmidt's formula for composite score correlation was applied (1990, pp.454-463).

Attenuation Correction

Correction for Predictor Reliability

Coefficient alphas were used to correct the reliability of personality measures. When such information was missing in some studies, the alpha information provided by the studies using the same personality measure was adopted. For example, the measurement reliability

information on 16PF provided in Bergman et al (Bergman, Drasgow, Donovan, Henning, & Juraska, 2006) was used in Bergman et al (Bergman, Donovan, Drasgow, Overton, & Henning, 2008), Marcus et al (2007), Bing & Lounsbury (2000), and Jenkins & Griffith (2004), which also used 16PF for personality measure. As per the studies with house-developed personality measures, if the reliability information was not available for particular measures and efforts to obtain the reliability information were unsuccessful, an average over studies using house-developed personality measures was used (Bergman et al, 2008; Hattrup et al., 1998; LaHuis et al., 2005; Weekley & Ployhart, 2005; Weekley, Ployhart, & Harold, 2004; Barrick & Zmmerman, 2009; Clevenger, Pereira, Wiechmann, Schmitt, & Harvey, 2001; McManus & Kelly, 1999). For studies where the information on measurement reliability was not reported (e.g., TSDI, Perkins & Corr, 2006), yet the range of the measurement reliability for the personality measure was given (O'Keefe, 1999), such information was used to substitute for the missing information.

Correction for Criterion Reliability

The measurement errors pertaining to subjective and objective performance ratings were corrected with different methods. A value of .34, representing the systematic error, was subtracted from the coefficient alpha value provided by each primary study to correct for both systematic and random measurement errors associated with subjective performance rating. The value of .34 is based on a widely cited number of .52, the measurement reliability of subjective rating suggested by Viswesvaran and his colleagues (Viswesvaran, Ones, & Schmidt, 1996) which itself was based on an alpha coefficient of .86 (and a corresponding random error of .14). As .52 implies a total of .48 for both systematic and random error, with a random error of .14, the systematic error is .34. As per the correction for the measurement error pertaining to objective

measure, .55—an average over .61, test-retest reliability for low complex jobs and .50, test-retest reliability for high complex jobs (Sturman et al., 2005)—was used. Among the papers where the coefficient alpha value was not available for a particular performance measure, an average alpha value based on the studies using the same scale was used as a substitute.

Consideration of Outliers

Outliers are defined as the personality trait-job performance correlations with sizes at least two standard deviations away from the mean[9]. A sensitivity analysis was run (i.e., the same meta-analysis run twice, once including and once excluding outlier(s)) to assess the impact of the outlying study on the meta-analytic results and conclusions (e.g., Geyskens et al., 2006; Rothstein, 2003; Rothstein & McDaniel, 1989).

Table 4.2 lists outlying studies for each Big Five personality trait-job performance correlation based on two different data sets, one correcting for the sample errors only and the other correcting for both sampling error and measurement errors. There are eight outlying studies in the former data set and ten in the latter data set. Specifically, in the data set correcting for the sample errors only, there are four outlying studies for Openness-job performance correlation studies, five for Conscientiousness-job performance correlation studies, three for Agreeableness-job performance correlation studies, and none for either Extraversion- or Neuroticism-job performance correlation studies; in the data set correcting for both sampling error and measurement errors, there are six outlying studies for Openness-job performance correlation studies, one for Conscientiousness-job performance correlation studies, one for Extraversion-job performance correlation studies, three for Agreeableness-job performance

[9] Outliers are usually defined as observations more than three standard deviations away from the mean. Nevertheless, in this meta-analysis, the normal distribution of the correlations between job performance and each Big Five trait showed up only when the correlations two standard deviations away from the mean were removed from the data set.

correlation studies, and none for Neuroticism-job performance correlation studies. As the number of outlying studies is small compared to the total number of studies, the influences of outlying studies on the results is small.

Publication Bias[10]

Publication bias is a phenomenon such that primary studies with significant results are more likely to be published than those without significance and therefore positively bias the results of the meta-analytic study, which is based exclusively on published papers (Rothstein, 2003). A request for unpublished studies was posted through the listserv both at the Organization Behavior and Human Resources Management divisions at the Academy of Management to locate these papers. Such search effort results in locating one unpublished paper. Due to the insufficient number of unpublished papers, the analysis of publication bias is not able to be carried out.

Missing Information Substitution

Not every paper included in the meta-analysis provided information on every variable of interest. In the following paragraphs, I explain on how I calculated scores to substitute for the missing information for the following variables: time-related variables, reliability information for performance measures and for personality measures, and job zone.

[10] I am aware that some meta-analyses (e.g., Thoresen et al., 2003) conducted the "file drawer analysis" (Hunter & Schmidt, 1990; Orwin, 1983; Rosenthal, 1979) to address the problem of availability bias by computing the number of unpublished studies (fail-safe k) and the number of research participants in k unpublished studies (fail-safe N) necessary to reduce the absolute value of the mean corrected correlation. As, first, we lack information on the p-value for each of the effect sizes reported by the primary studies included in the meta-analysis to convert to the z values in order to compute the overall significance level for the set of studies, the first step in applying file drawer analysis; and, second, the number of "lost" studies on any topic (based on such computation) usually turns out to be unlikely large to have very little likelihood of existing (e.g., the number typically turns out to 6,000), therefore, such analysis was not computed.

Temporal Variables

Out of the 150 samples, 115 samples (77%) provided age information, 32 samples (21%) provided information on work experience, and 97 samples (65%) provided information on organizational tenure. The number of samples providing all three time-related variables was 13 (9%). The average age across all samples that provided age information was 34.77 years-old (ranging from 20.00 to 50.70 years old with a standard deviation of 7.45 years), the average number of years of work experience was 6.32 years (ranging from 0.98 to 19.00 years with a standard deviation of 4.55 years), and the average number of years of organizational tenure was 4.95 years (ranging from 0.00 to 20.00 years with a standard deviation of 4.45 years).

If the authors mentioned in their paper that they had collected information on time-related variables yet such information was not reported in their publications, they were contacted through email to obtain such information. Such procedure generated two more papers (Anderson et al., 2008; O'Connell et al., 2007).

I used one of two basic strategies to substitute the missing information for time-related variables. First, I decided to treat information on work experience as that for organizational tenure because of four findings: (a) most studies used organizational tenure and job experience interchangeably (Sturman, 2003); (b) the number of samples reporting information on job experience was much smaller than that on organizational tenure; and (c) only information on organizational tenure across industries and occupations is available from the authoritative source (i.e., Bureau of Labor Statistics). Alternatively, I took three basic steps to substitute the missing time-related information in studies: first, I categorized the studies with the O*NET code; second, I identified the relationship between the age and organizational tenure across the studies reporting both information; and third, I applied the identified relationship between age and

organizational tenure to the studies reporting either the age or the organizational tenure. For example, out of the 38 samples using professionals (e.g., executives, managers, employees in business and financial occupations, employees in computer-related occupations), a total of 22 samples provided both the age and the organizational tenure information. A regression was run based on these 22 pairs of data to obtain the age-organizational relationship, and the regression model was used to calculate the missing information on age or organizational tenure. Table 3.1 summarized the measures of the three time-related variables.

Insert Table 3.1 about here

To ensure the reasonableness of such approach to substitute for the missing information on temporal variables, the information on the median number of years that wage and salary workers had been with their current employer (i.e., organizational tenure) categorized by age, industry, and occupation released by U.S. Bureau of Labor Statistics (BLS) on September 14, 2010 was used as a comparison to that identified by this meta-analysis. Specifically, as per the category by age, median number of years of organizational tenure of 4.4 years reported by BLS is very close to the figure of 4.5 years obtained in this meta-analysis based on 97 samples. In addition, the median years of tenure within different age groups reported by BLS were comparable to those found in this meta-analysis, despite the stark differences in the sample sizes between this meta-analysis and BLS report: the median years of tenure was a little bit lower than that reported by the BLS (1.0 years vs. 1.5 years-BLS) for the age group of 20 to 24 years based on 17 samples, whereas the median years of tenure was higher for the age group of 35 to 44 years (7.8 years vs. 5.1 years-BLS) based on 66 samples and was higher for the age group of 45 to 54 years (10.3 years vs. 7.8 years-BLS) based on 9 samples. The median years of organizational tenure was the same (3.1 years) based on 58 samples in this study as that reported

by the BLS. As per the median number of years of tenure categorized by industry, wage and salary workers in the public sector were reported by the BLS to have nearly double the tenure of their counterparts in the private sector, with 7.2 years of tenure in the public sector versus 4 years of tenure in the private sector. Since the majority of participants in the samples used for this meta-analysis worked in the private sector, the median years of tenure in the public sector was not available, whereas that for the private sector was very close to what was reported by the BLS. As per the median number of years of tenure categorized by occupation, workers in management, professional, and related occupations had the highest median tenure (5.2 years) out of the major occupational groups with workers in management occupation having the highest median tenure (6.1 years). At the same time, workers in service occupations had the lowest median organizational tenure (3.1 years) with the food preparation and serving related occupations having the lowest median tenure (2.3 years). These figures were very close to those found in this meta-analysis: the median years of organizational tenure for participants holding middle-level managerial positions was 8 years and that for restaurants employees was 2.1 years. In sum, the similarity in the median number of years of tenure by categories of age, industry, and occupation reported by BLS and that identified in this meta-analysis demonstrates that the methods adopted to substitute for the missing information on temporal variables were reasonable.

Reliability Information for Personality Measures

Table 3.2 shows the average reliability information on personality measure for each Big Five dimension across studies. The weighted mean (Mean (W)) was used to substitute missing reliability information for personality measures on seven studies: two studies used the EPI measure (Furham et al., 1999; Smillie et al., 2006), two studies used house-developed personality

measures (Clevenger et al., 2001; Shaw & Gupta, 2004), one study used the MMPI measure (Cortina et al., 1992), one study used the PSI measure (Loveland, Gibson, Lounsbury, & Huffstetler, 2005), and one study used the TSDI measure (Perkins & Corr, 2006).

Insert Table 3.2 about here

Reliability Information for Performance Measures

Out of the 150 samples, 117 (78%) samples used composite performance measures, 17 (11%) samples used global measures, and 16 (11%) samples used objective measures. Out of the 117 samples using composite performance measures, 101 (86%) samples provided the reliability information on performance measures. Out of the 17 samples using global performance measures, three (18%) samples reported the reliability information on performance measures. Mean, median, and sample-size weighted mean for the reliability of composite performance measures were calculated based on 101 samples with 23,578 total participants, shown in Table 3.3. The results showed small differences among these three measures of centrality. After considering the 95% confidence interval, .87, the mean, was used to substitute for the missing reliability information on performance measures in the studies using composite performance measures and global performance measures.

Insert Table 3.3 about here

Job Complexity

Table 3.4 summarizes the number of samples, participants, and positions falling under each job zone based on 124 samples with 24,952 participants holding 50 different positions (i.e., the 26 studies where the participants came from a wide range of occupations were not included in this table). This table also lists the number of samples and participants in each occupation in

each job zone. I found that most participants hold positions in job zone 2 and job zone 3—49% and 35% of all participants, respectively—and 11% of participants hold positions in job zone 4. In total, 95% of participants work in job zones 2, 3, or 4.

Insert Table 3.4 about here

CHAPTER 4

RESULTS

The meta-analysis results are organized into three sections: mean effect size for each Big Five personality trait as performance predictors using Hunter & Schmidt's Method; results of Level-2 unconditional model with HLM analysis, including the estimated mean effect size for each personality trait as a performance predictor and the significance of the variation in mean effect sizes across primary studies; and results of a Level-2 conditional model with HLM analyses on the significance of either age or organizational tenure as one explanation for variation in personality trait-job performance correlations across samples for each of the Big Five traits.

Mean Effect Size for Each Big Five Trait as Performance Predictor with Hunter & Schmidt Method

Table 4.1 summarizes the number of samples, number of participants, mean effect size, minimum correlation, median correlation, maximum correlation, total observed variance, variance due to sampling error, 95% confidence interval, and 80% credibility interval across the studies for each Big Five dimension based on four different data sets: (1) before removing outliers, correcting for sampling error only; (2) before removing outliers, correcting for both sampling error and measurement error; (3) after removing outliers, correcting for sampling error only; (4) after removing outliers, correcting for both sampling error and measurement error.

Insert Table 4.1 about here

Two outlier analyses were conducted, one for the data set correcting for the sampling error only and one for the data set correcting for both the sampling error and measurement error.

Table 4.2 lists the outliers under each of the two data sets, specifying the mean correlation between each Big Five trait and job performance as well as the standard deviation for the correlation, and the magnitude of correlation for each outlier along with the number of standard deviations away from the mean. Outliers were defined as the correlations with sizes at least two standard deviations away from the mean. Comparing both the data set correcting for the sampling error only and that correcting for both the sampling error and measurement errors, before and after removing outliers, the mean effect size only changed in Openness, for which the correlation decreased from .03 to .02 in the former data set and decreased from .04 to .02 in the latter data set.

Insert Table 4.2 about here

Based on the data set correcting only for the sampling error, the mean effect sizes of three personality traits in this meta-analysis were very close to those reported by Hurtz & Donovan (H&D)(2000)[11]: Openness (.03 vs. .04 H&D), Conscientiousness (.14 vs. .14 H&D), and Agreeableness (.08 vs. .07 H&D); the mean effect size of Extraversion in this meta-analysis was higher than that in Hurtz & Donovan (2000) (.09 vs. .06 H&D) and the mean effect size of

[11] The comparison of the mean effect sizes for each personality trait as performance predictors was carried out only between the correlations corrected for the sampling error only. Because Hurtz and Donovan (2000) corrected for errors pertaining to range restriction in addition to the measurement errors while this meta-analysis chose to focus on measurement error correction only, the comparison between mean effect sizes (corrected) could not be conducted. The decision to not correct for the range restriction errors in this meta-analysis was based on several reasons: (1) the number of studies having job applicants completed the personality trait tests is much smaller than that having job incumbents completed the personality test, and no theoretical nor empirical evidence has shown the correlation between the scores of personality test and those of other selection tools. Therefore, there is no evidence of the range restriction on the personality test scores between the job applicants and job incumbents; (2) Hurtz and Donovan (2000)'s approach for range restriction (i.e., creating a single artifact distribution for each of the five dimensions) is not appropriate in this meta-analysis because Hurtz and Donovan (2000) exclusively relied on studies with FFM-based personality measures whereas this meta-analysis included studies with both FFM-based and non-FFM based personality measures; (3) if the very purpose to correct for range restriction error was to compare the mean effect size (corrected), it would still be preferable to compare those correcting for the sampling errors only because the approaches to correct for measurement errors were different between this meta-analysis and Hurtz and Donovan (2000); and (4) whether to correct for range restriction following Hurtz and Donovan (2000)'s approach would not affect the results on how age explained the significance of the variance across the studies, the very focus of this meta-analysis.

Neuroticism was lower than that reported in Hurtz & Donovan (2000) in terms of Emotional Stability (-.04 vs. .09 H&D). Moreover, the order of the correlation sizes for the Big Five traits was similar between this meta-analysis, either including or excluding the outliers, and that reported by Hurtz and Donovan (2000). Conscientiousness (.14) exhibited the highest correlation with job performance followed by Extraversion (.09), Agreeableness (.08), Neuroticism (-.04), and Openness to experience (.03). In Hurtz & Donovan (2000), Conscientiousness (.14) also demonstrate the highest and Openness (.04) the lowest correlations amongst the Big Five with Neuroticism (.09) exhibiting the second highest correlation, Agreeableness (.07) the third highest, and Extraversion (.06) the 4th highest.

Comparing the total observed variance in the mean effect size, that of Openness was larger in this meta-analysis than in Hurtz & Donovan (2000) before removing the outliers (.0138 vs. .0093 H&D) but smaller after the outliers were removed (.0071 vs. .0093H&D). The total observed variance in the mean effect size for Conscientiousness was smaller than that reported by Hurtz & Donovan (2000) (.0118/.0094 vs. .0161), whereas that for Neuroticism was higher than that reported by Hurtz & Donovan (2000) in terms of Emotional Stability (.0155/.0166 vs. .0084H&D) either before or after removing the outliers. The total observed variances in the mean effect size for Extraversion (.0137/.0137 vs. .0111H&D) and Agreeableness (.0136/.0122 vs. .0108 H&D) were close to those reported by Hurtz & Donovan (2000). Comparing the variances due to sampling error in the mean effect size, those based on this meta-analysis were smaller in each personality dimension than those reported by Hurtz & Donovan (2000): Openness (.0048 vs. .0064 H&D), Conscientiousness (.0041vs. .0054H&D), Extraversion (.0041 vs. .0060 H&D), Agreeableness (.0039 vs. .0062 H&D), and Neuroticism (.0050 vs. .0065 H&D).

As per the comparison between the 95% confidence interval and 80% credibility interval, which provide us information about the nature of the true estimates of the correlations with the former estimating the variability around estimated mean correlation and the latter assessing the variability of individual correlations around study results, the results were similar between these two studies. Specifically, the range of 95% confidence interval for Openness (.00-.06 vs. .01-.07 H&D), Conscientiousness (.12-.16 vs. .10-.18 H&D), and Agreeableness (.05-.10 vs. .04-.10 H&D) are overlapping between the two studies. However, the one exception to this finding was the interval for Neuroticism, as the 80% credibility interval indicated the possible presence of moderators in Neuroticism-job performance correlation in this meta-analysis whereas not in Hurtz and Donovan (2000).

In sum, the results on the mean effect sizes for each Big Five personality as performance predictor reported by Hurtz and Donovan (2000) and those identified by this meta-analysis are similar in the order of magnitude as well as in the range of 95% confidence interval, indicating that Hurtz and Donovan (2000) and this meta-analysis are drawing on a similar population of studies and that research findings in this study are not different from those in Hurtz and Donovan (2000).

Results of Level-2 Unconditional Model with HLM Method

Table 4.3 showed the results of the Level-2 unconditional model on the mean effect size for each personality trait as performance predictors. Except for Openness, whose significance as performance predictor ($\beta = .0887$, $p = .02$) diminished when the outliers were removed from the data set, other personality traits turned out to be significant performance predictors based on the data set either including the outliers (1) or excluding the outliers (2): Conscientiousness ($\beta = .2531$, $p = .00$ (1); $\beta = .2467$, $p = .00$ (2)), Extraversion ($\beta = .1475$, $p = .00$ (1); $\beta = .1311$, $p =$

.00(2)), Agreeableness (β = .1084, p = .00 (1); β = .0969, p = .00 (2)), and Neuroticism (β = -.1299, p = .00 (1); β = -.1361, p = .00 (2)).

Insert Table 4.3 about here

Table 4.4 reported the significance of the variation in mean effect sizes across primary studies. The finding of the significances of the effect size variation for each Big Five personality trait as performance predictors indicates the existence of moderators to account for such variability. That is, some theoretical-based moderators might explain the variations in the personality trait-job performance correlations across the studies.

Insert Table 4.4 about here

Results of Level-2 Conditional Model with HLM Method

Table 4.5 to Table 4.9 reported how age explained the variation in personality trait-job performance correlations across samples for each Big Five personality trait with the Level-2 conditional model of HLM. The results showed that Extraversion (β = .2563; p = .00) and Agreeableness (β = .2092; p = .00) turned out to be significant predictors of job performance among the youngest employees in the workplace. At the same time, as employee age increased, the correlation between Extraversion (β = -.0048; p = .1005), Agreeableness (β = -.0074; p = .0315) and job performance decreased. Such results supported Hypotheses 3 and 5. Specifically, Hypothesis 3 predicted a weakened positive Extraversion-job performance correlation over time, and Hypothesis 5 expected a diminishing positive correlation between Agreeableness and job performance over time. However, Hypotheses 1, 2, and 4 were not supported.

We also noticed that job zone, the controlling effect variable measuring job complexity, enhanced the relationship between Openness (β = .2138; p = .05), Agreeableness (β = .1284; p =

.05) and job performance in complex jobs as well as strengthened the Conscientiousness-job performance correlation (β = .0726; p = .05) and weakened the Extraversion-job performance correlation (β = -.1036; p = .03) in jobs lower in complexity. Another controlling effect, global measure (versus composite), emerged as negatively affected the Agreeableness-job performance correlation (β = -.1231; p = .08). In other words, when global rating was adopted rather than composite performance rating, the correlation between Agreeableness and job performance decreased.

Insert Table 4.5 – 4.9 about here

Tables 4.9 to Table 4.13 report how organizational tenure explained the variation in personality trait-job performance correlations across samples for each Big Five personality trait with the Level-2 model of HLM. Organizational tenure seemed not to relate to the variation in personality traits as performance predictors. Nevertheless, the results about the moderating effect from job zone, which measured job complexity, on the personality trait-job performance correlation were very similar to those adopting age to operationalize temporal variable. Specifically, job zone showed to enhance the relationship between Openness (β = .2009; p = .06), Agreeableness (β = .1107; p = .08) and job performance in complex jobs as well as to strengthen the Conscientiousness-job performance correlation (β = .0726; p = .05) and weaken the Extraversion-job performance correlation (β = -.0969; p = .04) in less-complex jobs.

Insert Table 4.10 – Table 4.14 about here

CHAPTER 5

DISCUSSION

Theories and empirical studies support performance dynamism (e.g., Hofmann et al., 1992; Ployhart & Hakel, 1998; Sturman, 2007) and correspondingly suggest the potential of criterion-related validity dynamism of selection tools. In other words, temporal variables might represent important influences on the correlation between selection test scores and job performance ratings. Nevertheless, little validation research considers applying the idea of performance dynamism to personnel selection research (e.g., Sackett & Lievens, 2008). The deficiency in the empirical testing of the changing validity of selection devices will seriously hinder the effective development and validation of selection tools (e.g., Sackett & Lievens, 2008; Ployhart, 2004; Ployhart et al., 2006; Van Iddekinge & Ployhart, 2008). This paper looks for evidence of criterion-related validity dynamism of the Big Five traits as one selection test in the previous research. Although some hypotheses related to validity dynamism were not supported, this meta-analysis did indeed show that age explains some of the variability in findings for the Extraversion- and Agreeableness-job performance correlations. By showing that a sample's age moderated the relationships of Extraversion and Agreeableness with job performance, this study provides evidence that performance dynamism should be considered in future validation research.

Key Findings

Based on 150 independent samples extracted from 118 papers, with sample sizes ranging from 74 to 123 and total number of participants between 15,436 and 29,157, the results of this study showed that each Big Five trait was a significant predictor of job performance. Moreover, larger intercepts for Extraversion and Agreeableness were exhibited in the model controlling for

the age effects compared to those based on the model not controlling for the age effects. In addition, decreases in the magnitude of correlations between Extraversion and Agreeableness and job performance along with increases in age were observed. That is, other than the finding of the significance of each Big Five trait as performance predictors, this meta-analysis identified a high validity of some personality traits as performance predictors among young adults as well as some preliminary evidence of the dynamic nature of the criterion-related validity of some personality traits. Another important finding of this meta-analysis is the moderating effect of job complexity on the personality trait-job performance correlation.

Implication for Research on Personality Traits and Selection

Significance of Each Big Five Trait as Performance Predictor

Each Big Five personality trait has shown to be significant performance predictors, despite their low to moderate validity coefficients with overall job performance. Specifically, other than Conscientiousness and Neuroticism, which have been established as the most consistent performance predictors across job and criteria, this study further asserts that Agreeableness, Extraversion, and Openness—previously viewed as predictors of jobs requiring cooperation, interpersonal interaction, and innovation, respectively—also have a small yet consistent impact on overall job performance. Such results demonstrated the utility of having Big Five measures in the personnel selection context. That is, Big Five traits can help explain individual differences in performance variance to some extent. Moreover, in conjunction with other merits pertaining to personality traits as performance predictors, such as low or zero correlation with other popular selection tools (e.g., cognitive ability test) (e.g., Day & Silverman, 1989; Rosse, Miller, & Barnes, 1991), low cost, and less discriminant nature against minorities, such small increments in explained variance can make some significant contributions to

predictive efficiency for job performance (e.g., Hattrup, Rock, & Scalia, 1997; Schmitt, Rogers, Chan, Sheppard, & Jennings, 1997).

Higher Validity of Extraversion and Agreeableness as Performance Predictor among Young Employees

The finding of a decrease in the efficiency of Extraversion and Agreeableness as performance predictors for older employees provides us some new perspectives on personality tests as selection tools, such that personality trait tests might be particularly useful in predicting performance among young employees experiencing the school-to-work transition. It seems that personality traits which facilitate learning or socialization will be particularly useful to predict job performance among new graduates at their first formal job. For example, unlike learning in a school environment, where students are given most of the information they need and often well informed of what is required of them, on-the-job learning is far less structured (e.g., Ashford & Black, 1996; Morrison, 1993; Ostroff & Kozlowski, 1992). Socialization, one common form of on-the-job learning offered by most organizations, is often reputable for its ineffectiveness with respect to helping new employees assimilate into an organization (e.g., Morrison, 1993). Under such circumstances, extraverted graduates—characterized by their active search through different sources about their job, their role in the organization, organizational norms and processes, their colleagues, and their own performance to help themselves acquire new knowledge not otherwise or freely provided at the formal socialization process—tend to excel in a set of work demands (e.g., Ashford & Black, 1996; Miller & Jablin, 1991; Morrison, 1993; Ostroff & Kozlowski, 1992). Furthermore, the significant correlation between Agreeableness and performance of young employees is possibly related to agreeable newcomers' often efficient responses to the demands from incumbents or authority figures in the organization regarding appropriate role

behaviors. Agreeable young employees, due to their particularly strong desire to get along with others, are most likely to conform to a certain degree with the requests of those in the workplace. Such conformity behavior is argued to be functional, particularly among young new hires (Scandura, 2002).

Age-Related Weakened Correlations between Extraversion and Agreeableness and Job Performance

The exhibition of the weakened age-related correlations between certain personality traits and job performance presents us with some preliminary evidence of the dynamic nature of the criterion-related validity of personality traits, demonstrating, at least in some cases, the flawed assumption of a static validity coefficient prevalent in the selection research and the need to adopt a set of figures, rather than a single constant, to reflect validity dynamism. In particular, the emergence of age as a significant predictor of the variation in the Extraversion- and Agreeableness-job performance correlations across studies provides some vital explanation of why Extraversion and Agreeableness, despite strong literature support for their roles as significant performance predictors, sometimes showed to be insignificant predictors of job performance (e.g., Barrick & Mount, 1991; Hurtz & Donovan, 2000). That is, the significance of these two personality traits as performance predictors might depend on the age of the participants in the study; significant correlations might diminish as the ages of the participants increase.

The finding that age, not organizational tenure, turned out to be a significant predictor might be because age often serves as a proxy indicator for a broad constellation of age-related processes that exert diverse and indirect effects on work outcomes (e.g., Ng & Feldman, 2008; Warr, 2001). Additionally, age, compared with organizational tenure, might capture more elements that change over time, which will subsequently influence the personality trait-job

performance correlation. For example, the change in work motivation with age cannot be reflected in the length of organizational tenure (e.g., Kanfer & Ackerman, 2004), and age-related decreases in growth motives related to work features—such as learning and advancement among older workers, based on the adult development theories (i.e., Selection, Optimization, & Compensation (SOC) theory (Baltes, Staudinger, & Lindenberger, 1999) and Kanfer & Ackerman (2004)) (Kooij, de Lange, Jansen, Kanfer, & Dikkers, 2010)—might be useful information in understanding the weakened correlation between work motivation-related personality traits and job performance over time. Another possible explanation for the finding that age, not organizational tenure, turned out to be a significant predictor might be attributed to the loose use of organizational tenure across studies. That is, most studies use tenure-related measures, such as department tenure, job tenure, or organizational tenure, interchangeably to a point that they are treated as synonyms even though experience gained in different contexts might have unique effects on job performance or other related measures of performance effectiveness (Tesluk & Jacobs, 1998). For example, most studies investigating job experience (i.e., experience with a job or set of highly similar jobs) have operationalized this concept by job tenure (i.e., the amount of time spent in a job) (McDaniel, Schmidt, & Hunter, 1998; Medoff & Abraham, 1980; Schmidt et al., 1986). The loose use of these tenure-related measures might compromise organizational tenure's emergence as one significant predictor of the variation in personality trait-job performance correlations across primary studies.

The exhibition of the dynamic criterion-related validity of personality traits also indirectly demonstrates the phenomenon of performance dynamism: as personality traits are relatively stable (McCrae & Costa, 1990), the change in magnitudes of personality traits as performance predictors over time might be attributed to performance dynamism. This realization

has significant implications not only in personnel selection research, such that the validity of selection devices for predicting job performance obtained at one time point cannot be generalized to any other time point, but also in other important areas of human resources management research, such as training, development, appraisal, and compensation (Sturman, 2007).

At the same time, neither the weakened correlations between Openness, Neuroticism, and job performance nor the strengthened correlation between Conscientiousness and job performance were shown in this meta-analysis. The speculation of organizational tenure serving as a double-edged sword towards creativity (Ng & Feldman, 2010) might shed some light on the emergence of such insignificant results. On one hand, open individuals with low organizational tenure may be more proactive and innovative in their approach to problems, as they do not share the socially-constructed bindings that might hamper the creative effort of long-tenured employees. On the other hand, long-tenured employees may be so familiar with basic routines that they have both more time and more tacit knowledge with which to experiment with new ideas (Ng & Feldman, 2010).

The insignificance of age as a predictor of the variation in the Neuroticism-job performance correlation across studies might be due to the age-related increase in emotional intelligence (e.g., Kanfer & Ackerman, 2004). Specifically, a negative relationship between Neuroticism and job performance is expected due to an increased knowledge of the work system and familiarity with the work environment as well as the decrease in the workplace stressors coming along with the increase in the years with the organization based on the research in the area of work adjustment (e.g., Chao et al., 1994; Sturman, 2003; Wright & Bonett, 2002). As a result, Neuroticism, closely associated with how well individuals are able to manage stress,

becomes less critical as a performance predictor. At the same time, older adults often display relatively lower levels of Neuroticism and higher levels of emotional intelligence, reflected in their increased ability to regulate their moods through use of active reappraisal of the environment and consequently are less subject to the negative stimuli (e.g., Aldwin, 1991; Gross et al., 1997; Siu et al., 2001). It seems that, though a weakened Neuroticism-job performance correlation over time is expected either from the perspective of the organizational tenure-related influences or age-related decreases in Neuroticism, neither force is strong enough to show as a significant predictor of the variation in Neuroticism-job performance correlation across studies. Another plausible explanation of the insignificance of age on the Neuroticism-job performance correlation might be due to the two theoretical perspectives, which lead to contradictory expectation on the possible moderating effects of workers' age on the stressor-performance relationship. Specifically, the 'decrement theory of aging' argues that certain physical and cognitive changes may relate to age (Giniger, Dispenzieri, & Eisenberg, 1983), and these changes may negatively affect a worker's health and coping resources, resulting in stronger stressor-performance linkages with increasing age. Nevertheless, the other perspective argues that the increasing wisdom, experience, and coping ability which come with age allow older individuals to use their coping resources (e.g., increasing problem-solving skills and decision-making effectiveness in older adults) more effectively and therefore buffer the effects from stressors as well as decrease the stressor-performance correlation with increasing age (Folkman & Lazrus).

The insignificance of age as one possible explanation of the variation in Conscientiousness-job performance correlations across studies might be due to the cancellation between the organizational tenure-related forces leading to an enhanced Conscientiousness-job

performance correlation over time and the age-related forces predicting a decrease in the work motivation in general and a weakened Conscientiousness-job performance correlation over time. Specifically, Conscientiousness, which differentiates the extent to which individuals are motivated to continuously strive for high performance, serves as a better performance predictor in the later stages of employment when the motivation coming with the novelty of job and work environment often diminish. Research also found age-related decreases in work motivation such that individuals tend to shift their goal orientation from striving for gains in early years of employment to maintaining the status quo or preventing losses as they get older (e.g., Ebner et al., 2006; Rhodes, 1983). As one line of argument suggests a strengthened correlation between Conscientiousness and job performance over time whereas one forecasts a weakened correlation, the two forces may cancel out and result in age showing to be an insignificant predictor.

We must also note that the relationship between personality traits and behaviors, such as job search and mentoring search behavior, which closely relate to the promotion and movements between organizations, might further confound either age or organizational tenure as effective predictors of variation in the correlations between personality traits and job performance across studies. As per the correlation between personality trait and job search behavior, research shows that Neuroticism, Openness, and Agreeableness significantly predict job search behavior even after accounting for the effects of situational factors (Boudreau, Boswell, Judge, & Bretz Jr., 2001). With regard to personality trait and mentoring searching behavior, individuals' personality characteristics, especially those pertaining to the perceptions and reactions to the environment (e.g., Neuroticism and Extraversion), influence the extent to which individuals attempt to initiate mentoring relationships (Turban & Dougherty, 1994). In addition, age might relate to the frequency of movements between organizations. For example, research found that

younger people are more likely to pursue boundaryless careers (i.e., frequent changes in employers, jobs, or occupations) and protean careers (i.e., career self-management and loyalty to oneself over the organization) than traditional careers (i.e., hierarchical moves within one company), actively seeking learning opportunities to enhance their employability and showing a higher level of movement from employer to employer (Hall, 2002). Moreover, organizational tenure relating to the selection effect such that the less productive workers may voluntarily leave, be dismissed, or be persuaded to take early retirement whereas their more productive colleagues may be promoted to supervisory positions and remain employed in the same workplace over time results in an increase in the average performance assessment of older workers (Shirom, Gilboa, Fried, & Cooper, 2008).

Moderating Effect of Job Complexity on Personality Trait-Job Performance Correlation

Another important finding of this meta-analysis is the moderating effect of job complexity, operationalized by different job zones, on the personality trait-job performance correlation. Higher levels of job complexity enhanced the Openness- and Agreeableness-job performance correlations, while lower levels of job complexity strengthened the Conscientiousness-job performance correlation and weakened the Extraversion-job performance correlation. Such results seem reasonable for a number of reasons. In general, job complexity arises from such sources as unclear means (i.e., ambiguity on how to proceed to reach goals and objectives), multiple means (i.e., different ways to perform the same work tasks), and unclear ends (i.e., uncertainty concerning what exactly should be accomplished on the job) (e.g., Campbell, 1988; Huber, 1985) and, accordingly, complex jobs often do not have a straightforward and easily recognized procedure to be followed for completion (Huber, 1985).

As a result, open employees, who appreciate the merits of new ways of doing things and are more willing and able to come up with new ideas that improve or change the status quo, often thrive in such environments. Likewise, Agreeableness, the personality trait reflecting a strong individual desire to minimize the negative effects of interpersonal conflict and to get along well with others, is expected to lead to particularly high performance in complex jobs where cooperation is often a requisite for task accomplishment. Compared with those engaging in complex jobs, individuals working in less complex jobs often exhibit lower scores of Conscientiousness. However, those highly conscientious individuals in less complex jobs are more likely to perform better than their colleagues in the same job due to their persistence and goal orientation. Another feature of complex jobs, high levels of supervisor monitoring (George & Zhou, 2001), makes them a weakening factor in the Extraversion-job performance correlation. Specifically, a workplace where supervisors engage in close monitoring, ensuring that their subordinates do what they are told and perform tasks in expected ways, might make the Extraversion-oriented subordinates, who are prone to take initiative and actively socialize with others, feel that they are constantly being evaluated, directed, and controlled, feelings which often lead to lower performance. Therefore, consistent with findings in other research on the moderating role of job complexity in personality trait-job performance correlation (e.g., Sturman, 2003; Sturman et al., 2005), this meta-analysis demonstrated the critical role of job complexity in the personality and selection research.

Overall, this meta-analysis, other than showing the significance of each Big Five trait as performance predictors, enables us to achieve some preliminary understanding of the extent to which temporal variables explain the significant variation of effect size for personality traits as performance predictors across primary studies.

Limitations

One limitation of this study, as of other meta-analyses, is the relatively small number of studies for several of the moderating effects, which prohibited us from simultaneously controlling for the effects other than the temporal variables that might account for the variation in personality trait-job performance correlations across studies. Research has suggested that the validity of the Big Five as performance predictors might be subject to the personality measures (e.g., Morgeson et al., 2007a, 2007b; Sackett & Lievens, 2008). For example, Oh and his colleagues (Oh, Wang, & Mount, 2010) found that the operational validities of all FFM traits based on a single observer rating are higher than those obtained in meta-analyses based on self-report measures. In fact, the magnitude of the differentials between validities based on observer-ratings and self-reports in predicting overall performance is substantial (at least .10) except for the trait of Emotional Stability. Even for Emotional Stability, the observer validity is larger by .04, which translates into about a 30% gain in validity. In addition, Hough (1998) identified that observed validity was smaller for predictive designs than for concurrent designs by an average of .07 by reanalyzing personality validation data as applicants are more likely than incumbents to attempt to fake their response on personality tests to increase their chances of being selected (e.g., Hausknecht, 2010; Van Iddekinge & Ployhart, 2008). Even though no theoretical or empirical studies suggest the correlation between these effects and age, the inability to control for such effects might compromise the results of this meta-analysis to some extent.

The use of mean age or median age of participants in the sample as the proxy for temporal variables is another limitation of the study. Research suggests that the choice of measures for temporal variables might have a significant effect on the research results (e.g., Morrow & McElroy, 1987). For example, one study examining work commitment and job

satisfaction over three career stages (Morrow & McElroy, 1987) found that the method of operationalizing career stage produced differential patterns of findings relative to commitment and satisfaction. Specifically, defining career stages in terms of age produces consistent relationships between career stages and forms of commitment, whereas using organizational or positional tenure as measures of career stages does not generate the same results. In this meta-analysis, the insignificance of age in Conscientiousness, Neuroticism, and Openness might be due to the operationalization of the temporal variable.

Future Research

The constraints pertaining to the meta-analysis listed in the limitation section highlight the need for more primary studies on validity dynamism. Furthermore, Ng and Feldman, who conducted a series of time-related meta-analyses—such as the correlations between age and job performance (2008), age and job attitudes (2010), organizational tenure and job performance (2010), and age, work experience, and psychological contract (2009)—pointed out that longitudinal studies, which track the same set of individuals over time, will enable researchers interested in time-related issues to fully understand how the intraindividual process of aging or increases in organizational tenure affect the personality trait-job performance correlation. In most extant studies of the personality trait-job performance relationship, researchers collected job performance for one time point; thus, these samples do not allow detection of changes in the personality trait-job performance relationship over time. Moreover, longitudinal studies will be particularly helpful in measuring the mediating variables relating to the time-related effects on the changing personality trait-job performance correlation over time. The process of aging can bring on a number of physical, cognitive, and emotional changes that may help explain more concretely why age explains the dynamic nature of criterion-related validity of personality traits.

One example is that aging may cause changes in self-efficacy, which may in turn affect the performance of employees. Changes in the frequency and intensity of emotional expression that accompany aging may also affect the way coworkers and supervisors interact with older workers and consequently the performance among older workers. Thus, longitudinal studies enabling researchers to measure mediating processes may be one of the most effective ways to help researchers explain not only that age or organizational tenure matter, but why age or organizational tenure matter. It is worth noting that the task of collecting data over several years might be daunting if not impossible. However, when the data collection period is not long enough, the meaningful aging or organizational tenure effect might not be identified. One effective method to deal with such situation might be to gather data longitudinally across critical points during the employment tenure, such as maintenance period and transition period, or on four aging periods corresponding to important career stage transitions—the school-to-work transition (typically surrounding age 20), between the exploration and the establishment stages (typically surrounding age 30), between the establishment and career maintenance stages (typically surrounding age 40), and between the career maintenance and career decline stages (typically surrounding age 50)—to directly compare the criterion-related validities of personality traits over time (e.g., Judge et al., 1999; Thoresen et al., 2004).

Future studies, either primary or meta-analytical, can also further delve into areas which will contribute not only to the theories on performance dynamism in general or the dynamic nature of criterion-related validity of personality traits in particular but also to the selection research as a whole. One fruitful area of investigation is how personality trait relates to the change in the performance level over time, the rate of the change in the performance level, or the implication of the curvilinear rather than the linear development of performance on the

personality trait-performance relationship. Another area to examine is how personality trait relates to each performance dimension, such as task performance, contextual performance, or counterproductive workplace behavior, over time. In general, compared with that of the task performance, the fluctuation of contextual or counterproductive performance may be much larger; specifically, the task performance is related more to the basic performance requirements on a particular position and the jobholder has to maintain a certain level of performance to keep the position whereas contextual or counterproductive performance are more discretional or volitional in nature and therefore fluctuated more over employment tenure (Hunt, 1996). For example, research on aging and development suggests that older individuals adapt to aging by giving higher priority to socially-oriented tasks that are emotionally satisfying to them and, consequently, often dedicate more resources to those socially-oriented tasks (e.g., helping others, making constructive suggestions) than other technically-oriented job tasks (Carstensen, Isaacowitz, & Charles, 1999). Such change in employees' engagement in task performance, contextual performance, or counterproductive performance over time might have a profound effect on the efficiency of the employment of personality trait tests as a selection tool. Future studies can further compare how the changing correlations between personality trait and these performance dimensions differ from those correlations between personality trait and overall job performance. A related research area can be the investigation of how personality traits relate to the stable component and the dynamic component of overall job performance.

Conclusion

This study provides us with some preliminary evidence of the idea of the criterion-related validity dynamism, which will contribute to both theory and practice in personnel selection. Theoretically, this study shows, at least in some instances, the flaw of the prevalent assumption

of the static validity coefficient pertaining to selection tools in selection research and the necessity of a shift from adopting a single constant to a set of figures to represent the dynamic nature of criterion-related validity of selection devices. In practice, the identification of validity dynamism implies that management should not simply rely on the validity of performance predictors obtained at one particular time to determine its selection criteria but rather to focus on the validity over a longer period of time, depending on the nature of employment.

The current research on personality trait-job performance relationship has been evolving around such themes as comparison between the prediction efficiency between the lower-level and the higher-level categories of personality (e.g., Denis, Morin, & Guindon, 2010; Dudley et al, 2006; Hastings & O'Neill, 2009; Perry, Hunter, Witt, & Harris, 2010) and between overall job performance and performance dimensions (e.g., Klehe & Anderson, 2007; Van Iddekinge & Ployhart, 2008) and the development of process models of personality-job performance relationship (e.g., Gerhardt, Rode, & Peterson, 2007; George & Zhou, 2001; Kiffin-Petersen, Jordan, & Soutar, 2011; Le, Oh, Robbins, Ilies, Holland, & Westrick, 2011; Meyer, Dalal, & Bonaccio, 2009; Ng, Ang, & Chan, 2008; Tabak, Nguyen, Basuray, & Darrow, 2009; Taylor, Kluemper, Mossholder, 2010) and of personality measures (e.g., Oh, Wang, & Mount, 2010; Salgado, 2003). The proposed idea of validity dynamism, a shift in treating validity from static to dynamic, integrated with measurement and process model development in the selection research, will not only enhance the precision of extant knowledge of personality trait-job performance relationship and aid prediction about when personality trait is most efficient in predicting job performance but also provide a starting point for systematic research and theory development in an area where there is currently little empirical data.

Table 3.1 Measures of Temporal Variables

Temporal Variables	No of Sample	Min	Med	Max	St Dev	95% CI
Age	115	20.00	35.80	50.70	7.45	(33.39, 36.14)
Work Experience	32	0.98	5.27	19.00	4.50	(4.67, 7.96)
Organizational Tenure	97	0.00	4.00	20.00	4.50	(4.05, 5.84)

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Table 3.2 Reliability Information for Personality Measures

Big Five	Sample	Participants	Min	Med	Max	Mean	Mean (W)	Std Dev	95% CI
O	72	14,605	.52	.78	.95	.77	.77	.096	(.75, .80)
C	119	28,074	.54	.81	.98	.82	.79	.076	(.80, .83)
E	94	22,547	.61	.83	.98	.82	.80	.071	(.81, .84)
A	82	20,924	.58	.77	.97	.77	.75	.089	(.75, .79)
N	89	17,111	.68	.84	.97	.83	.87	.061	(.82, .85)

Table 3.3 Reliability Information for Performance Measures

Performance Measures	Sample	Participants	Min	Med	Max	Mean (W)	Mean	Std dev	95% CI
Composite Performance	101	23,578	.54	.89	.98	.85	.87	.08	(.86, .89)

Table 3.4 Information on Job Zone

Job Zone	Number of Samples	Number of Participants	Number of Positions	Position Title (O*NET Code) (Number of Samples) (Number of Participants within each Positions)
1	6	954	2	Restaurant employees (35-3031.00) (4) (618) Warehouse workers (43-5081.03) (2) (336)
2	49	12,122	13	Security guard (33-9032.00) (1) (271) Flight attendant (39-6031.00) (1) (423) Camp counselor (39-9011.00) (2) (351) Retail sales (41-2031.00) (14) (4928) Call center employees (41-9041.00) (6) (907) Bank teller (43-3071.00) (1) (95) Customer service (43-4051.00) (6) (770) Temporary helper/postal service clerk (43-5051.00) (62) Clerk/Office clerk, General (43-9061.00) (10) (1614) Engine and other machine assembler (51-2031.00) (3) (1370) Bus operator (53-3021.00) (1) (864) Truck drivers(53-3032.00) (2) (286) Train operator (53-4041.00) (1) (181)
3	43	8,850	19	Middle managers/front line supervisors/GM (11-102 1.00) (13) (1496) Hotel manager (11-9081.00) (1) (270) IT employee/computer technician (15-1041.00) (2) (309) Social service employees (21-1093.00) (2) (98) Hospital nurse (29-1111.00) (1) (35) Lab employees (29-2012.00) (1) (198) Fire fighters (33-2011.00) (1) (55) Police/Law enforcement officers (33-3051.01) (4) (3375) Resident assistant (39-9041.00) (1) (99) Sales/whole sale (41-4012.01) (4) (493) Real estate agent (41-9022.00) (1) (131) Managers of office and Administration workers (43-1011.00) (2) (225) Commercial bank employees (3) (296) Eligibility interviewers (43-4061.00) (1) (42) HR representative (43-4161.00) (1) (316) Equipment installer (49-2097.00) (1) (335) Industrial machinery mechanics (49-9041.00) (2) (710) Repair generalist (49-9042.00) (1) (254) Managers of production and operating workers (51-1011.00) (1) (113)
4	22	2,764	13	Bank managers (11-3031.02) (3) (403) HR managers (11-3040.00) (1) (345) Management analyst/Consultants (13-1111.00) (1) (53) Accountants (13-2011.01) (1) (62) Programmers (15-1021.00) (1) (106) Technical and managerial expatriate positions (15-1051.00) (1) (143) Electronic engineers (17-2072.00) (1) (112) Industrial engineers (17-2112.00) (2) (328) Manufacturing engineers (17-2199.04) (2) (172) Child, family, and school social workers (21-1021.00) (1) (93) Insurance sales agents (41-3021.00)(4) (636) Sales agents-financial services (41-3031.02) (1) (104) Sales/wholesale/technical (41-4011.00) (3) (207)
5	4	262	3	Management executive (11-1011.00) (2) (128) Faculty member (25-1011.00)(1) (106) Medical intern (29-1063.00) (1) (28)
Total	**124**	**24,952**	**50**	

Table 4.1 Meta-Analyses of Mean Effect Sizes Using Hunter & Schmidt Method

Before the Removal of Outliers										
Mean Effect Size _ Correcting for Sampling Error only										
	k	**N**	$\bar{r}$	**min**	**med**	**max**	$S\bar{r}^2$	Se^2	**95% CI**	**80% CreI**
O	74	15,436	.03	-.24	.02	.76	.0138	.0048	(.00, .06)	(-.09, .15)
C	123	29,157	.14	-.17	.16	.61	.0118	.0041	(.12, .16)	(.02, .25)
E	99	23,785	.09	-.23	.07	.48	.0137	.0041	(.07, .11)	(-.03, .22)
A	85	21,900	.08	-.31	.06	.51	.0136	.0039	(.05, .10)	(-.05, .20)
N	94	19,010	-.04	-.37	-.08	.28	.0155	.0050	(-.07, -.02)	(-.18, .09)
Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors										
	k	**N**	ρ_c	**Min**	**med**	**max**	$S\rho_c^2$	Se_c^2	**95% CI**	**80% CreI**
O	74	15,436	.04	-.42	.04	.99	.0313	.0048	(.00, .09)	(-.16, .25)
C	123	29,157	.21	-.30	.24	.84	.0261	.0039	(.18, .24)	(.02, .40)
E	99	23,785	.14	-.41	.12	.80	.0311	.0040	(.11, .18)	(-.07 .35)
A	85	21,900	.12	-.56	.09	.73	.0304	.0038	(.08, .16)	(-.09, .33)
N	94	19,010	-.05	-.56	-.11	.44	.0396	.0050	(-.09, -.01)	(-.29, .18)
After the Removal of Outliers										
Mean Effect Size _ Correcting for Sampling Error only										
	k	**N**	$\bar{r}$	**min**	**med**	**max**	$S\bar{r}^2$	Se^2	**95% CI**	**80% CreI**
O	70	14,967	.02	-.24	.02	.27	.0071	.0047	(.00, .04)	(-.05, .08)
C	118	28,596	.14	-.12	.16	.40	.0094	.0040	(.12, .15)	(.04, .23)
E	99	23,785	.09	-.23	.07	.48	.0137	.0041	(.07, .11)	(-.03, .22)
A	82	21,702	.08	-.24	.06	.40	.0122	.0037	(.05, .10)	(-.04, .19)
N	94	19,010	-.04	-.37	-.08	.28	.0161	.0050	(-.07, -.01)	(-.17, .09)
Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors										
	k	**N**	ρ_c	**min**	**med**	**max**	$S\rho_c^2$	Se_c^2	**95% CI**	**80% CreI**
O	68	14,800	.02	-.29	.03	.40	.0165	.0046	(-.01, .05)	(-.12, .16)
C	122	29,045	.21	-.30	.24	.70	.0247	.0039	(.18, .24)	(.02, .39)
E	98	23,664	.14	-.41	.12	.64	.0290	.0040	(.10, .17)	(-.06, .34)
A	82	21,702	.12	-.40	.09	.58	.0272	.0037	(.08, .16)	(-.08, .32)
N	93	18,957	-.05	-.43	-.09	.18	.0220	.0049	(-.08, -.03)	(-.22, .12)
Mean Effect Size Reported by Hurtz & Donovan (2000)										
	k	**N**	$\bar{r}$	ρ_c[a]	ρ_v[b]		$S\bar{r}^2$	Se^2	**95% CI**[c]	**80% CreI**[c]
O	35	5,525	.04	.07	.06		.0093	.0064	(.01, .07)	(-.03, .11)
C	45	8,083	.14	.22	.20		.0161	.0054	(.10, .18)	(.01, .27)
E	39	6,453	.06	.10	.09		.0111	.0060	(.03, .09)	(-.03, .15)
A	40	6,447	.07	.13	.11		.0108	.0062	(.04, .10)	(-.02, .16)
N	37	5,671	.09	.14	.13		.0084	.0065	(.06, .12)	(.03, .15)

Note. k = number of validity coefficients; N = total sample size; $\bar{r}$ = sample-size weighted mean observed validity; min = the smallest correlation among the studies; med = the median correlation among the studies; max = the largest correlation among the studies; $S\bar{r}^2$ = total observed variance in $\bar{r}$; Se^2 = variance due to sampling error for $\bar{r}$; ρ_c = true score correlation (corrected for sampling error, predictor unreliability, and criterion unreliability); $S\rho_c^2$ = total observed variance in ρ_c; Se_c^2 = variance due to sampling error for ρ_c; ρ_v = true (operational) validity (corrected for sampling error, criterion error); 95% CI = 95% confidence internal; 80% CreI = 80% credibility interval; O = Openness; C = Conscientiousness; E = Extraversion; A = Agreeableness; N = Neuroticism.

a. Hurtz and Donovan (2000) corrected range restriction in addition to sampling error, predictor unreliability, and criterion unreliability for ρ_c whereas this meta-analysis only corrected for sampling error, predictor unreliability, and criterion unreliability for ρ_c.
b. Hurtz and Donovan (2000) corrected range restriction in addition to sampling error, and criterion unreliability for ρ_v whereas this meta-analysis only corrected for sampling error and criterion unreliability for ρ_v.
c. I calculated 95% confidence interval and 80% credibility interval for Hurtz and Donovan (2000) in order to conduct the comparison between this meta-analysis and Hurtz and Donovan (2000).

Table 4.2 List of Outliers among the Primary Studies

Outliers in the Data Set Correcting for Sampling Error only					
	Big Five Traits				
Paper	**O** (.04/.15)[a]	**C** (.16/.13)	**E** (.09/.15)	**A** (.07/.16)	**N** (-.08/.13)
Anderson et al _ 2008	-	-.17(-2.54)	-	-.31(-2.38)	-
Bing & Lounbury_2000	.36(2.13)[b]	-	-	-	-
Byrne et al _ 2005	-	.50(2.62)	-	-	-
Cortina et al _1992	-	-.17(-2.54)	-	-	-
Dalton & Wilson _2000	-	.47(2.38)	-	.49(2.63)	-
Hui et al _ 2009	.76(4.80)	.61(3.46)	-	.51(2.75)	-
Lance et al _ 2007	.35(2.07)	-	-	-	-
Shaffer et al _ 2006	.42(2.53)	-	-	-	-
Outliers in the Data Set Correcting for both Sampling Error and Measurement Errors					
	Big Five Traits				
Paper	**O** (.06/.22)	**C** (.24/.20)	**E** (.14/.22)	**A** (.10/.24)	**N** (-.12/.19)
Anderson et al _ 2008	-.42(-2.18)	-	-	-.56(-2.75)	.44(2.95)
Bing & Lounbury_2000	.53(2.14)	-	-	-	-
Byrne et al _ 2005	-	-	-	-	-
Cortina et al _1992	-	-	-	-	-
Dalton & Wilson _2000	-	-	-	.73(2.63)	-
Fisher _ 2003	-	-	.80(3.00)	-	-
Hui et al _ 2009	.99(4.23)	.84(3.00)	-	.70(2.50)	-
Hunthausen et al _2004	.46(1.82)	-	-	-	-
Lance et al _ 2007	.54(2.18)	-	-	-	-
Shaffer et al _ 2006	.64(2.64)	-	-	-	-

a. (.04/.15) = (the mean correlation of the studies /the standard deviation for the correlations)

b. .36(2.13) = the correlation reported by the study (the number of standard deviations away from the mean)

Table 4.3 Meta-Analyses of Mean Effect Sizes Using HLM Method (Result of Level-2 Unconditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors				
Before the Removal of Outliers				
	Estimate	**Std Error**	**t Ratio**	**p-value**
Openness (n=74) - Intercept	.0887	.0425	2.088	.02*
Conscientiousness (n=123) - Intercept	.2531	.0200	12.658	.00***
Extraversion (n=99) - Intercept	.1475	.0248	5.955	.00***
Agreeableness (n=85) - Intercept	.1084	.0267	4.069	.00***
Neuroticism (n=94) - Intercept	-.1299	.0209	-6.211	.00***
After the Removal of Outliers				
	Estimate	**Std Error**	**t Ratio**	**p-value**
Openness (n=68) - Intercept	.0225	.0183	1.232	.11
Conscientiousness (n=119) - Intercept	.2467	.0170	14.482	.00***
Extraversion (n=97) - Intercept	.1311	.0222	5.897	.00***
Agreeableness (n=79) - Intercept	.0969	.0227	4.276	.00***
Neuroticism (n=92) - Intercept	-.1361	.0206	-6.607	.00***

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

Table 4.4 Variance Significance of Effect Sizes Using HLM Method (Result of Level-2 Unconditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors					
Before the Removal of Outliers					
	Standard Deviation	**Variance Component**	**df**	χ^2	**p-value**
Openness (n=74) - Mean Effect Size	.3532	.1248	73	1166.76	.00***
Conscientiousness (n=123) - Mean Effect Size	.2038	.0415	122	972.02	.00***
Extraversion (n=99) - Mean Effect Size	.2289	.0524	98	873.61	.00***
Agreeableness (n=85) - Mean Effect Size	.2291	.0525	84	761.78	.00***
Neuroticism (n=94) - Mean Effect Size	.1809	.0327	93	757.19	.00***
After the Removal of Outliers					
	Standard Deviation	**Variance Component**	**df**	χ^2	**p-value**
Openness (n=68) - Mean Effect Size	.1225	.0150	67	247.79	.00***
Conscientiousness (n=118) - Mean Effect Size	.1643	.0270	117	715.04	.00***
Extraversion (n=97) - Mean Effect Size	.1993	.0397	96	726.47	.00***
Agreeableness (n=79) - Mean Effect Size	.1832	.0336	78	616.47	.00***
Neuroticism (n=92) - Mean Effect Size	.1757	.0309	91	748.03	.00***

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

Table 4.5 Moderating Effects from Age Using HLM Method
Openness
(Result of Level-2 Conditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors				
Before the Removal of Outliers				
Openness (n=74)	**Estimate**	**Std Error**	**t Ratio**	**p-value**
Intercept	.1760	.1193	1.47	.07†
Age	-.0071	.0063	-1.12	.13
Job zone 1 or 2	-.0360	.0968	-.37	.36
Job zone 4 or 5	.2138	.1287	1.66	.05*
Global performance rating	-.0411	.1387	-.30	.38

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

Table 4.6 Moderating Effects from Age Using HLM Method
Conscientiousness
(Result of Level-2 Conditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors				
Before the Removal of Outliers				
Conscientiousness (n=123)	**Estimate**	**Std Error**	**t Ratio**	**p-value**
Intercept	.2270	.0537	4.23	.00***
Age	-.0006	.0030	-.19	.42
Job zone 1 or 2	.0726	.0445	1.63	.05*
Job zone 4 or 5	.0480	.0633	.76	.23
Global performance rating	-.0464	.0656	-.71	.24

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

Table 4.7 Moderating Effects from Age Using HLM Method
Extraversion
(Result of Level-2 Conditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors				
Before the Removal of Outliers				
Extraversion (n=99)	**Estimate**	**Std Error**	**t Ratio**	**p-value**
Intercept	.2563	.0666	3.85	.00***
Age	-.0048	.0037	-1.29	.10†
Job zone 1 or 2	-.1036	.0556	-1.86	.03*
Job zone 4 or 5	.0090	.0750	.12	.45
Global performance rating	-.0270	.0758	-.36	.36

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

Table 4.8 Moderating Effects from Age Using HLM Method
Agreeableness
(Result of Level-2 Conditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors				
Before the Removal of Outliers				
Agreeableness (n=85)	**Estimate**	**Std Error**	**t Ratio**	**p-value**
Intercept	.2092	.0734	2.85	.00**
Age	-.0074	.0039	-1.88	.03*
Job zone 1 or 2	-.0219	.0601	-.36	.36
Job zone 4 or 5	.1284	.0761	1.69	.05*
Global performance rating	-.1231	.0856	-1.44	.08†

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

Table 4.9 Moderating Effects from Age Using HLM Method
Neuroticism
(Result of Level-2 Conditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors				
Before the Removal of Outliers				
Neuroticism (n=94)	**Estimate**	**Std Error**	**t Ratio**	**p-value**
Intercept	-.0824	.0576	-1.43	.08†
Age	-.0028	.0032	-.86	.20
Job zone 1 or 2	-.0232	.0491	-.47	.32
Job zone 4 or 5	.0150	.0646	.23	.41
Global performance rating	-.0264	.0632	-.42	.34

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

Table 4.10 Moderating Effects from Organizational Tenure Using HLM Method Openness (Result of Level-2 Conditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors				
Before the Removal of Outliers				
Openness (n=74)	**Estimate**	**Std Error**	**t Ratio**	**p-value**
Intercept	.0897	.0936	.96	.17
Organizational Tenure	-.0044	.0112	-.39	.35
Job zone 1 or 2	-.0108	.0948	-.11	.46
Job zone 4 or 5	.2009	.1291	1.56	.06†
Global performance rating	-.0274	.1394	-.20	.42

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

Table 4.11 Moderating Effects from Organizational Tenure Using HLM Method Conscientiousness (Result of Level-2 Conditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors				
Before the Removal of Outliers				
Conscientiousness (n=123)	**Estimate**	**Std Error**	**t Ratio**	**p-value**
Intercept	.2230	.0448	4.98	.00***
Organizational Tenure	-.0007	.0051	-.14	.45
Job zone 1 or 2	.0732	.0445	1.64	.05*
Job zone 4 or 5	.0464	.0625	.74	.23
Global performance rating	-.0475	.0657	-.72	.24

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

Table 4.12 Moderating Effects from Organizational Tenure Using HLM Method Extraversion (Result of Level-2 Conditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors				
Before the Removal of Outliers				
Extraversion (n=99)	**Estimate**	**Std Error**	**t Ratio**	**p-value**
Intercept	.2222	.0546	4.07	.00***
Organizational Tenure	-.0062	.0067	-.93	.18
Job zone 1 or 2	-.0969	.0554	-1.75	.04*
Job zone 4 or 5	-.0090	.0736	-.12	.45
Global performance rating	-.0245	.0762	-.32	.37

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

Table 4.13 Moderating Effects from Organizational Tenure Using HLM Method
Agreeableness
(Result of Level-2 Conditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors				
Before the Removal of Outliers				
Agreeableness (n=85)	**Estimate**	**Std Error**	**t Ratio**	**p-value**
Intercept	.1093	.0621	1.76	.04*
Organizational Tenure	-.0022	.0073	-.30	.36
Job zone 1 or 2	.0078	.0606	-.13	.45
Job zone 4 or 5	.1107	.0773	1.43	.08†
Global performance rating	-.1065	.0877	-1.22	.11

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

Table 4.14 Moderating Effects from Age Using HLM Method
Neuroticism
(Result of Level-2 Conditional Model)

Mean Effect Size _ Correcting for both Sampling Error and Measurement Errors				
Before the Removal of Outliers				
Neuroticism (n=94)	**Estimate**	**Std Error**	**t Ratio**	**p-value**
Intercept	-.0860	.0455	-1.89	.03*
Organizational Tenure	-.0065	.0057	-1.14	.13
Job zone 1 or 2	-.0209	.0475	-.44	.33
Job zone 4 or 5	.0130	.0638	.20	.42
Global performance rating	-.0281	.0630	-.45	.33

Note. ***p≤.001, one tailed; **p≤.01, one tailed; *p≤.05, one tailed; †p≤.10, one tailed.

APPENDIX A

LIST OF PRIMARY STUDIES USED IN THE META-ANALYSES

Anderson, C., Spataro, S.E., & Flynn, F.J. 2008. Personality and organizational culture as determinants of influence. ***Journal of Applied Psychology***, 93(3): 702-710.

Bajor, J.K., & Baltes, B.B. 2003. The relationship between selection optimization with compensation, conscientiousness, motivation, and performance. ***Journal of Vocational Behavior***, 63(3): 347-367.

Barrick, M.R., & Mount, M.K. 1993. Autonomy as a moderator of the relationships between the Big Five personality dimensions and job performance. ***Journal of Applied Psychology***, 78: 111-118.

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Barrick, M. R., Mount, M. K., & Strauss, J. P. 1993. Conscientiousness and performance of sales representatives: Test of the mediating effects of goal setting. ***Journal of Applied Psychology***, *78:* 715–722.

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Bergner, S., Neubauer, A.C., & Kreuzthaler, A. 2010. Broad and narrow personality traits for predicting managerial success. ***European Journal of Work and Organizational Psychology***, 19(2): 177-199.

Bing, M.N., & Burroughs, S.M. 2001. The predictive and interactive effects of equal sensitivity in teamwork- oriented organizations. ***Journal of Organizational Behavior***, 22: 271-290.

Bing, M.N., & Lounsbury, J.W. 2000. Openness and job performance in U.S.-based Japanese manufacturing companies. ***Journal of Business and Psychology***, 14(3): 515-522.

Bledow, R., & Frese, M. 2009. A situational judgment test of personal initiative and its relationship to performance. ***Personnel Psychology***, 62(2): 229-258.

Blickle, G., Meurs, J.A., Zettler, I., Solga, J., Noethen, D., Kramer, J., & Ferris G.R. 2008. Personality, political skill, and job performance. ***Journal of Vocational Behavior,*** 72(3): 377-387.

Blickle, G., Momm, T.S., Kramer, J., Mierke, J., Liu, Y., & Ferris, G.R. 2009. Construct and criterion-related validation of emotional reasoning skills: a two study investigation. ***International Journal of Selection and Assessment***, 17(1): 101-118.

Blickle, G., Momm, T., Schneider, P.B., Gansen, D., &Kramer, J. 2009. Does acquisitive self-presentation in personality self-ratings enhance validity? Evidence from two experimental field studies. ***International Journal of Selection and Assessment***, 17(2): 142-153.

Blickle, G., Wendel, S., & Ferris, G.R. 2010. Political skill as moderator of personality – Job performance relationships in socioanalytic theory: Test of the getting ahead motive in automobile sales. ***Journal of Vocational Behavior***, 76(2): 326-335.

Burke, L.A., & Witt, L.A. 2002. Moderators of the openness to experience-performance relationship. ***Journal of Managerial Psychology***, 17(8): 712-721.

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APPENDIX B

MAJOR CHARACTERISTICS OF PRIMARY STUDIES

No	Author	Yr	Journal	Size	Occupation[a]	Age	Tenure	OP	CP	EP	AP	NP	PM[b]
1	Anderson_ Spataro_Flynn	2008	JAP	65	Manufacturing engineers	36.76	5.81	-0.24	-0.17	-0.12	-0.31	0.07	BFI
2	Anderson_ Spataro_Flynn	2008	JAP	53	Management analysts	38.03	2.00	-0.02	-0.12	-0.06	0.09	0.28	BFI
3	Bajor_Baltes	2003	JVB	104	Bank employees (clerical)	43.68	5.79		0.30				IPIP
4	Bajor_Baltes	2003	JVB	122	Managers from finance service organization	42.84	7.89		0.37				IPIP
5	Barrick_Zimmerman	2009	HRM	95	Credit union tellers	21.00	2.00		0.18			-0.18	House
6	Barrick_Park_Mount	2005	PPsyc	102	EMBA/Wide range/Managers of office and Administration worker	32.30	4.49	0.12	0.16	0.11	0.03	-0.15	PCI
7	Barrick_Mount	1993	JAP	146	Middle managers/ First line supervisors	43.00	8.97	0.13	0.32	0.18	0.01	0.00	PCI
8	Barrick_Mount	1996	JAP	139	Truck drivers	25.00	0.08	-0.05	0.26	-0.04	0.00	-0.18	PCI
9	Barrick_Mount	1996	JAP	147	Truck drivers	25.00	0.08	0.07	0.27	0.02	0.06	-0.15	PCI
10	Barrick_Mount_Strauss	1993	JAP	91	Sales representatives	37.00	10.00	0.08	0.21	-0.01	-0.01	-0.03	PCI
11	Barrick_Mount_Strauss	1994	PPsyc	194	Sales rep-whole sale	38.00	8.70		0.25				PCI
12	Barrick_Stewart_Piotrowski	2002	JAP	164	Telemarketing sales rep	30.67	2.45	-0.05	0.26	0.21	-0.12	-0.14	OPQ
13	Bauer et al	2006	JAP	67	Executive-level employees	40.97	0.50			0.25			Mini-Markers
14	Bergman_ et al	2006	IJSA	123	Supervisors-non technical	42.00	16.00	0.01	-0.01	-0.11	-0.05	-0.12	16PF
15	Bergman et al	2008	HP	123	Managers	47.00	8.55	-0.03	0.00	-0.08	-0.04	0.09	16PF
16	Bergman et al	2008	HP	148	Support staff for insurance agents	40.00	7.06	0.05					House
17	Bergner et al	2010	EJOWO Psyc	128	Middle managers-technical	40.12	11.83	0.12	0.11	0.16	0.13	-0.11	NEO-FFI
18	Bing_Burroughs	2001	JOB	175	National guardmen	20.50	5.40		0.23		0.15		NEO-FFI
19	Bing_Burroughs	2001	JOB	206	Camp counsellors	35.25	2.50		0.21		0.32		CC-PSI
20	Bing_Lounsbury	2000	JBPsyc	113	Managers of production and operating workers	36.00	6.04	0.36	0.06	0.07	-0.04	-0.26	16PF
21	Bledow_Frese	2009	PPsyc	77	Bank employees	36.00	14.00		0.12				Farh et al
22	Blickle et al	2010	JVB	112	Sales representatives	39.50	12.68	0.01	0.18	0.06	0.06	-0.36	NEO-FFI
23	Blickle et al	2008	JVB	326	Wide range	41.40	8.32		0.10		0.02		BFI

24	Blickle, MK et al	2009	IJSA	83	Wide range	42.40	8.72	-0.11	-0.04	0.08	0.01	-0.22	NEO-FFI
25	Blickle, MS et al	2009	IJSA	93	Wide range	37.96	11.50	-0.10	-0.01	-0.07	-0.14	0.05	BFI
26	Burke_Witt	2002	JMPsyc	114	Clerks-finance service firm	31.29	4.65	0.12	0.23	-0.03	0.07	-0.21	PCI
27	Byrne et al	2005	JVB	139	Restaurant employees	23.47	2.00		0.50				NEO-PI
28	Caligiuri	2000	PPsyc	143	Expatriates- technical and managerial positions	40.00	1.80	-0.05	0.34	-0.06	0.19	-0.10	HPI
29	Cellar et al	1996	JAP	423	Flight attendent trainees	20.00	0.13	0.14	0.10	0.15	0.17	-0.11	NEO-PI
30	Chan_Schmitt	2002	HP	102	Administration support-entry level positions	28.45	3.45	0.20	0.13	0.13	0.16	-0.02	NEO-FFI
31	Clevenger et al	2001	JAP	412	Entry-level agents	38.18	3.47		0.02				PCI
32	Clevenger et al	2001	JAP	207	Customer service	36.42	8.31		0.16				OPQ
33	Clevenger et al	2001	JAP	107	Manufacturing engineers	27.27	6.26		0.18				House
34	Colbert_Witt	2009	JAP	162	Clerks/Office clerks	32.86	5.97		0.23			0.02	PCI
35	Conte_Gintoft	2005	HP	174	Retail sales representatives	28.15	6.80	0.00	0.05	0.25	0.06	0.02	Mini-Markers
36	Conte_Jocobs	2003	HP	181	Train operators	42.65	11.59	-0.12	0.19	-0.10	-0.13	0.03	HPI
37	Cortina et al	1992	PPsyc	224	Police recruits	24.18	0.50	-0.07	-0.17	-0.23	-0.01	-0.24	MMPI
38	Cote_Miners	2006	ASQ	175	University employees-wide range	41.00	10.00	0.07	-0.03	0.14	0.12	0.04	IPIP
39	Crant	1995	JAP	131	Real estate agents	47.00	8.37	-0.11	-0.05	0.01	-0.11	-0.10	NEO-FFI
40	Crant_Bateman	2000	JOB	156	Managers from finance service organization	32.00	10.00	-0.02	0.14	-0.05	0.15	-0.05	NEO-FFI
41	Cropanzano et al	1993	JOB	198	Lab employees	37.29	4.03			0.30		-0.26	PANAS
42	Cropanzano et al	1993	JOB	35	Hospital nurses	37.44	3.60			0.20		0.00	PANAS
43	Dalton_Wilson	2000	JCCPsyc	21	Expatriates-operation/project managers	41.58	16.88		0.47		0.49		NEO-PI-R
44	DeGroot_Kluemper	2007	IJSA	154	Store associates	36.34	1.25		0.14	0.13	0.01		Marker
45	de Hoogh et al	2005	JOB	61	Middle managers/First line supervisors	24.05	0.75	0.06	-0.05	-0.05	-0.24	0.11	NEO-PI-R
46	Deluga_Masson	2000	JRP	99	Resident assistants	23.68	1.00		0.06	0.18			NEO-FFI
47	de Meijer et al	2008	IJSA	682	Police officer trainees	28.86	1.00	-0.05	0.08	0.05	0.05	0.02	PPV
48	de Meijer et al	2008	IJSA	2365	Police officer trainees	21.00	1.00	0.03	0.03	0.05	0.03	0.08	PPV
49	Demerouti	2006	JOHPsyc	113	Wide range	40.00	10.00		0.05				Marker
50	Dirks_Skarlicki	2009	JOM	104	Bank/financial institute-sales agents	42.50	16.80		-0.05				NEO-FFI
51	Erez_Judge	2001	JAP	124	Insurance sales agents	43.00	11.90		0.01			-0.29	NEO-FFI

52	Fallon et al	2000	JBPsyc	317	Retail sales representatives	28.23	0.50		0.23				House
53	Ferris et al	2001	JAP	106	Programmers	37.77	5.03	0.02	-0.06	0.08	-0.06	-0.04	PCI
54	Fisher	2003	JOB	121	Wide range	26.42	0.49			0.48		-0.02	PANAS
55	Furham et al	1999	PID	203	Telesales staffs	30.88	5.54			0.07		0.04	EPI
56	Furnham_Fudge	2008	JID	66	Sales-health club membership	26.04	3.19	0.16	0.22	-0.02	-0.22	-0.08	NEO-FFI
57	Goffin et al	1996	JAP	68	Managers	36.00	4.00		0.33	0.44			PRF
58	Grant et al	2009	PPsyc	103	Managers	33.86	2.13					-0.01	Daniel
59	Grant et al	2009	PPsyc	55	Fire fighters	32.53	8.85					0.05	PANAS
60	Grant_Wrzesniewski	2010	JAP	93	Child, family, and school social workers	37.95	5.56				0.04		mini-IPIP
61	Greguras_Diefendorff	2010	PPsyc	154	Wide range-non managerial	35.91	4.03	0.01	0.23	0.06	0.31	-0.08	Mini-Markers
62	Griffin_Hesketh	2004	IJSA	131	IT employees	40.81	5.27	0.08				-0.02	IPIP
63	Griffin_Hesketh	2004	IJSA	28	Medical interns	28.06	1.00	0.07					NEO-PI-R
64	Griffin_Hesketh	2004	IJSA	55	Bank employees	27.91	0.58	0.08					IPIP
65	Hattrup et al	1998	HP	67	Customer service/sales rep	28.23	0.50		0.17				House
66	Hayes et al	1994	JBPsyc	136	Engine and other machine assemblers	40.00	5.13	-0.18	0.29	-0.09	0.01	-0.16	HPI
67	Higgins et al	2007	JPSPsyc	94	Engine and other machine assemblers	40.40	5.70	0.13	0.23	0.14	0.09	-0.06	FDTI
68	Higgins et al	2007	JPSPsyc	80	Wide range	38.30	7.92	0.03	0.08	-0.08	0.07	-0.01	FDTI
69	Hochwarter et al	1999	JVB	270	Hotel managers	33.50	11.10			0.35		-0.11	PANAS
70	Hochwarter et al	2000	JAP	813	Wide range	32.09	4.40		0.16				PCI
71	Hui et al	2009	IJSA	112	Electronic engineers	30.00	3.52	0.76	0.61	0.48	0.51	-0.37	IPIP
72	Hunthausen et al	2003	JAP	102	Entry level customer service managers	31.19	2.89	0.27	0.31	0.26	-0.02	-0.12	NEO-FFI
73	Jackson	2001	PID	60	Sales-wholesales & technic	40.00	9.98			0.07		0.06	EPP
74	Jackson et al	2006	JAP	178	Computer technicians	31.54	3.35	-0.14	0.14	-0.02	0.14	-0.05	BFI
75	Jacobs et al	1996	HP	864	Bus operators	32.54	5.00	-0.02	0.00	-0.07	-0.02	0.01	HPI
76	Jenkins_Griffith	2004	JBPsyc	62	Accountants	41.90	8.51	0.15		0.27	0.38	-0.10	16PF
77	Johnson_O'Leary-Kelly	2003	JOB	103	Bank employees	35.80	4.37					-0.17	PANAS
78	Johnson_O'Leary-Kelly	2003	JOB	103	Bank employees	35.80	4.37		0.08				Marker
79	Kamdar_Van Dyne	2007	JAP	230	Industrial engineers	32.23	5.50		0.37		0.36		NEO-PI
80	Kieffer et al	2004	JCPsyc	514	Wide range	32.70	2.77	0.05	0.07	0.00	0.06	0.06	NEO-PI-R
81	LaHuis et al	2005	HP	192	Entry level clerks in government	33.27	6.19		0.08				House

82	LaHuis et al	2005	HP	203	Clerical employees in government	46.18	3.02		0.21				NEO-FFI
83	Lance et al	2007	HP	104	Law enforcement officers	37.68	14.00	0.35	0.34	0.07	0.05	-0.36	Marker
84	Le et al	2010	JAP	602	Wide range-high level positions	46.33	10.31		0.18			-0.21	House
85	Loveland et al	2005	CYCF	145	Camp counsellors/Child care worker	20.00	1.00		0.27	0.27	0.28	-0.18	PSI
86	Lubbers et al	2005	JVB	195	Postsecondary co-ops	21.00	0.21		0.29				Marker
87	Mabon	1998	HP	62	Temporary helper/Postal service clerk	20.00	0.00	0.17	0.15	0.17	0.08	-0.28	HPI
88	Marcus et al	2007	HP	84	Middle managers/General managers	37.00	1.00	-0.04	0.18	0.41	0.06	-0.03	PRF
89	McManus_Kelly	1999	PPsyc	116	Insurance sales agents	33.86	0.50	0.20	0.02	0.28	0.16	-0.22	House
90	Motowidlo et al	2008	IJSA	140	Retail store associates	26.44	1.74		-0.02	0.02	-0.01	-0.06	NEO-FFI
91	Mount_Barrick_Strauss	1994	JAP	105	Sales rep - wholesale	43.00	7.00	0.09	0.18	0.06	0.05	-0.05	Marker
92	Mount_Barrick_Strauss	1999	JOM	146	Middle manager/General managers	37.00	20.00		0.25				PCI
93	Mount_Barrick_Strauss	1999	JOM	103	Sales representatives	30.00	1.00		0.27				PCI
94	Mount_Barrick_Strauss	1999	JOM	121	District managers at local newspaper	34.00	8.00		0.29				PCI
95	Mount_Oh_Burns	2008	PPsyc	133	Warehouse workers in food distribution company	33.50	9.20	0.02	0.22	0.05	0.12	0.09	PCI
96	Neuman_Wright	1999	JAP	316	HR representatives	30.00	6.46	-0.12	0.16	-0.03	0.40	0.01	NEO-PI-R
97	Ng et al	2008	JAP	303	Military recruits	22.46	2.00		0.20	0.19		-0.21	IPIP
98	Nikolaou	2003	JMPsyc	227	Wide range	25.00	4.30	0.04	0.06	-0.01	0.10	0.08	FFM GK
99	O'Connell et al	2007	IJSA	1140	Engine and other machine assemblers	38.90	5.51		0.15	0.09	0.10		O'Connell
100	Oh_Berry	2009	JAP	259	Middle manager/General managers	50.70	12.20	0.15	0.15	0.20	0.04	-0.17	WBI
101	Orvis et al	2008	JAP	106	Faculty member	38.27	0.67		0.03				Mini-Markers
102	Perkins_Corr	2006	PID	607	Navy officer candidates	22.00	0.49	-0.05	0.00	0.16	-0.10	0.01	TSDI
103	Perkins_Corr	2006	PID	62	British army officer candidates	20.00	0.00					0.01	TSDI
104	Piedmont_Weinstein	1994	JPsyc	207	Wide range-sales, customer service, management, finance	29.64	1.75	0.04	0.19	0.07	-0.13	-0.12	NEO-PI
105	Ployhart et al	2001	PPsyc	1259	Military trainee	20.34	0.25	0.08	0.11	0.21	0.07	0.15	IPIP

106	Ramo et al	2009	JMD	96	Managers and non-managers	36.50	6.25	-0.02	0.16	-0.12	-0.08	-0.36	NEO-FFI
107	Reid-Seiser_Fritzsche	2001	PID	90	customer service representatives at an insurance company	28.78	2.61	-0.03	0.20	0.00	0.21	-0.20	NEO-PI-R
108	Robie et al	2005	IJSA	133	Insurance sales agents	36.67	4.00			0.21	-0.22		GPI
109	Salgado_Rumbo	1997	IJSA	125	Managers from finance service organizations	41.00	8.13	-0.11	0.32	0.13	-0.03	-0.23	NEO-FFI
110	Sawyerr	2009	JOSM	194	Telesales staffs	35.00	3.00	-0.03	0.12	0.06	-0.02	-0.09	IPIP
111	Shaffer et al	2006	JAP	140	Middle manager/General managers	45.00	7.00	0.42	0.14	0.27	0.23	-0.18	IPIP
112	Shaw_Gupta	2004	PPsyc	236	Wide range-professionals	46.77	3.72			0.20		-0.17	PANAS
113	Shaw_Gupta	2004	PPsyc	163	Employees from 1 hospital & 2 automative suppliers	25.66	8.00					-0.11	House
114	Shaw_Gupta	2004	PPsyc	345	Personnel managers	35.00	4.97			-0.01			PANAS
115	Small_Diefendorff	2006	JASPsyc	143	Wide range-service, clerk, technical, et al	39.70	2.00	-0.09	0.12	-0.04	0.22	-0.16	Mini-Markers
116	Smillie et al	2006	JAP	59	Telesales staffs	28.49	2.60			-0.05		0.14	EPI
117	Stewart	1996	JAP	152	Membership sales	31.39	4.25			0.08			NEO-PI
118	Stewart	1999	JAP	98	Membership sales	31.39	4.25		0.16				NEO-PI-R
119	Stewart	1999	JAP	85	Membership salespersons	31.92	1.00		0.16				NEO-PI-R
120	Stewart_Carson	1995	JBPsyc	105	Hotel service employees	30.17	4.22		0.33	-0.18	0.19		Marker
121	Stewart et al	1996	PPsyc	130	Hotel employees-food preparation, service, housekeeping	28.65	2.00	0.18	0.27	0.11	0.20	-0.24	Marker
122	Strang_Kuhnert	2009	LQ	61	Managerial executives	46.13	10.28	0.02	0.07	-0.03	0.18	0.06	PLP
123	Sy et al	2003	JVB	187	Restaurant employees	20.71	2.47	0.01	-0.09	0.32	0.20	-0.03	BFI
124	Tett et al	2003	JOB	335	Equipment installers	35.00	4.50	-0.12	0.13	-0.02	0.11	-0.04	HPI
125	Tews et al	2010	JOSM	139	Restaurant employees	25.50	2.26	0.02	0.20	-0.20	0.10	-0.12	mini-IPIP
126	Tews et al	2010	JOSM	153	Restaurant employees	24.56	1.58	0.10	0.01	0.06	-0.01	0.05	NEO-FFI
127	Thoresen et al	2004	JAP	99	Sales-wholesales/technic	41.76	11.11	-0.02	0.26	0.22	0.01	-0.12	NEO-FFI
128	Thoresen et al	2004	JAP	48	Sales-wholesales/technic	36.77	7.92	0.25	0.10	0.20	0.36	0.05	NEO-FFI
129	Tsai et al	2007	JAP	263	Insurance sales agents	37.58	5.14			0.15			Marker
130	van Iddekinge et al	2009	PPsyc	471	Front-line leaders in the army	30.91	2.50		0.27			-0.07	AIM

131	Van Scotter_Motowidlo	1996	JAP	592	Industrial machinery mechanics/Military mechanics	25.00	5.94		0.22	0.10	0.14		NEO-PI
132	van Yperen	2003	PID	42	Social service employees-eligibility Interviewers for government programs	40.40	10.20			0.32		-0.33	PANAS
133	Wallace_Chen	2006	PPsyc	254	Repair generalists	40.00	5.00		0.18				Mini-Markers
134	Warr et al	2005	IJSA	78	Retail sales	33.79	6.00	-0.17	0.20	0.05	-0.15	-0.04	CCSQ
135	Warr et al	2005	IJSA	119	Car sales	34.85	3.00	-0.10	0.26	0.10	-0.19	0.03	CCSQ
136	Weekley_Ployhart	2005	HP	271	Loss prevention management employees/Security guards	36.33	7.71	0.01	0.21	0.27	-0.02	-0.14	House
137	Weekley et al	2004	HP	377	Retail salespersons	34.40	1.00		0.09	0.13	0.10		House
138	Weekley et al	2004	HP	2989	Retail salespersons	28.65	2.90		0.15	0.12	0.16		House
139	Westerman_Simmons	2007	JMI	106	Wide range	31.53	2.88	0.03	0.40	0.08	0.12	-0.14	NEO-FFI
140	Witt	2002	JOM	122	Nonsales office workers	29.37	6.49		0.20	-0.12			IPIP
141	Witt	2002	JOM	195	Call center employees (Health)	33.86	1.70		0.11	0.04			OPQ
142	Witt et al	2004	JOM	92	Call center employees (Finance)	31.00	3.00		0.13				PCI
143	Witt_Carlson	2006	JOHPsyc	136	Transaction administrators /Order filling employees	33.05	5.27		0.31				IPIP
144	Witt_Ferris	2003	JAP	98	Industrial engineers	39.59	5.54		0.12				PCI
145	Witt_Ferris	2003	JAP	118	Industrial machinery mechanics/Military mechanics	38.37	8.43		0.12				IPIP
146	Witt_Ferris	2003	JAP	116	Financial employees	31.10	4.16		0.15				IPIP
147	Witt_Ferris	2003	JAP	159	Sales workers	35.46	8.81		0.24				IPIP
148	Wright_Staw	1999	JOB	53	Social service employees	39.70	10.30			0.05		-0.03	PANAS
149	Wright_Staw	1999	JOB	45	Social welfare staffs (professional)	45.30	16.70			0.35			PsycWB
150	Wright et al	1995	JOM	203	Stock clerks-stockroom, warehouse, or storage yard	44.40	12.20		-0.10				PRF

Notes. OP = reported correlation between Openness and job performance; CP = reported correlation between Conscentiousness and job performance; EP = reported correlation between Extraversion and job performance; AP = reported correlation between Agreeableness and job performance; NP = reported correlation between Neuroticism and job performance; PM = personality measures; ASQ = Administrative Science Quarterly; CYCF = Child and Youth Care

Forum; EJOWOPsyc = European Journal of Work and Organizational Psychology; HP = Human Performance; HRM: Human Resource Management; IJSA = International Journal of Selection and Assessment; JAP = Journal of Applied Psychology; JASPsyc = Journal of Applied Social Psychology; JBPsyc = Journal of Business and Psychology; JCCPsyc = Journal of Cross-Cultural Psychology; JCPsyc = Journal of Counseling Psychology; JID = Journal of Individual Differences; JMD = Journal of Management Development; JMPsyc = Journal of Managerial Psychology; JOB = Journal of Organizational Behavior; JOHPsyc = Journal of Occupational Health Psychology; JOM = Journal of Management; JOMI = Journal of Managerial Issues; JOSM = Journal of Service Management; JPSPsyc = Journal of Personality and Social Psychology; JPsyc = The Journal of Psychology; JRP = Journal of Research in Personality; JVB = Journal of Vocational Behavior; LQ = The Leadership Quarterly; PID = Personality and Individual Differences; Policing = Policing: an International Journal of Police Strategies & Management; PPsyc = Personnel Psychology.

a. See Appendix E "Summary of Participants' Occupations across Primary Studies" for a detailed description of the occupations.

b. See Appendix C "Summary of Personality Measures across Primary Studies" to find out what the acronym for each personality measure stands for.

APPENDIX C

SUMMARY OF PERSONALITY MEASURES ACROSS PRIMARY STUDIES

Applicant Profile for Sales Associates (Aon Consulting, 1997)	
This instrument measures four broad constructs to assess the skills and abilities necessary to successfully perform the job of sales associates. One out of these four constructs measures Conscientiousness with 45 items.	Fallon et al (2000)
Assessment of Individual Motivation (AIM, Heggestad et al., 1999; White & Young, 1998)	
AIM is a test developed by the U.S. Army Research Institute (ARI) for the Behavioral and Social Science to assess important work-related temperament characteristics. AIM was implemented in February 2000 as a new market-expansion screening tool under the "GED (General Education Development) Plus" program. Under this program, non-high school diploma graduates who might otherwise ineligible for military service can enlist if they score sufficiently high on the AIM and meet other program requirements. AIM is a 38-item multidimensional forced-choice inventory. Each item within the AIM consists of four statements, each of which represents a different construct. For each item, respondents are asked to select the one statement that is most like them and the one statement that was least like them. Van Iddekinge et al (2009) used AIM to measure Conscientiousness and Emotional Stability.	Van Iddekinge et al (2009)
Big Five Inventory (BFI; John, Donahue & Kentle, 1991; John & Srivastava, 1999; Rammstedt & John, 2007)	
BFI, a 44-item questionnaire, was developed to represent the Big Five prototype definitions. BFI used short phrases based on the trait adjectives known to be the prototypical markers of the Big Five. BFI has shown substantial convergent and divergent relations with other Big Five instruments. An abbreviated 11-item version of BFI is available. However, it is recommended only in exceptional circumstances. There is no official BFI manual with published norms.	Anderson et al (2008) Blickle et al (2008) Jackson et al (2006) Sy et al (2006)
Camp Counselor Personality Style Inventory (CC-PSI; Bing & Gibson, 1997-unpublished manuscript; see Bing & Burroughs, 2001)	
CC-PSI is a personality selection test for camp counselor that was developed on the basis of the Big Five theory. Correlations between corresponding scales of the CC-PSI and the NEO-FFI are .67 ($p < .01$) for Agreeableness and .45 ($p < .01$) for Conscientiousness	Bing & Burroughs (2001)
Customer Contact Styles Questionnaire (CCSQ, SHL, 1997)	
CCSQ is an ipsative instrument (i.e., a specific type of measure in which respondents compare two or more desirable options and pick the one which is most preferred) covering a range of behavior styles that are likely to be important in many sales and service occupations. The construct validity of CCSQ is supported by the pattern of associations with other personality scales (SHL, 1997). Emotional stability: CCSQ resilience; Extraversion: mean of CCSQ sociable and persuasive; Openness: mean of CCSQ innovative, flexible, and analytical; Agreeableness; mean of CCSQ empathic, modest, and participative; Conscientiousness, mean of CCSQ competitive, results oriented, energetic, structured, detail conscious, and conscientious.	Warr, Bartram, & Martin (2005)
Eysenck Personality Inventory (EPI; Eysenck & Eysenck, 1964)	
EPI contains 57 items and involves two dimensions: neuroticism-stability and extraversion-introversion. EPI has been very widely used	Furnham et al (1999)

over the last 40 years. There is considerable evidence for its reliability and validity.	Smillie et al (2006)
Eysenck Personality Profiler (EPP; Eysenck, Barrett, Wilson, & Jackson, 1992)	
EPP is a 420-item questionnaire measuring three higher order personality scales (i.e., Extraversion, Neuroticism, and Psychoticism). Extraversion was calculated as the average score of sociability, activity, assertiveness, and ambition; Neuroticism was calculated as the average score of dependence, inferiority, unhappiness, anxiety, guilt and hypochondria; Psychoticism was calculated as the average score of risk-taking, manipulativeness, sensation-seeking, aggression, impulsiveness, irresponsibility, dogmatism and expressiveness.	Jackson (2001)
Five-Dimensional Temperament Inventory (FDTI, Higgins et al., 2007)	
FDTI, a 50-item questionnaire (with 10 for each of the five factors) measuring Emotional Stability (reverse Neuroticism), Extraversion, Openness, Agreeableness, and Conscientiousness, is modeled after Goldberg's (1992) list of 100 trait-descriptive adjectives. The relationship of the FDTI factors with the NEO-PI-R and Goldberg's TDA factors were previously investigated using a sample of 177 university undergraduates (Lee et al., 2001).	Higgins et al (2007)
Global Personality Inventory (GPI; Schmit et al., 2000, 2002)	
The development of the GPI was informed by both a personality model (the Big Five) (Paunonen, 1998) and a performance model Campbell et al., 1993, 1996; Davis et al., 1992). GPI was used to assess competitiveness, a facet of Extraversion construct, and interdependence, a facet of Agreeableness.	Robie et al (2005)
Goldberg's Big Five Marker (Goldberg, 1992)	
This personality inventory was developed to provide a set of Big Five factor markers that could replace those developed more than 30 years ago by Norman (1963); on the basis of responses obtained from 867 subjects and 205 peers, Goldberg identified 20 unipolar trait adjective variables for each dimension of the Big Five.	DeGroot & Kluemper (2007) Lance et al (2007) Lubbers et al (2005) Mount et al (1994) Shaw & Gupta (2004)_Study 1 Stewart & Carson (1995) Stewart et al (1996) Tsai et al (2007)
Hogan Personality Inventory (HPI; Hogan & Hogan, 1992, 1995)	
HPI is a 206-item, 13-scale measure of personality (Hogan & Hogan, 1992). HPI subdivided Extraversion into two subscales, sociability (24 true-false items) and ambition (29 true-false items); Agreeableness was measured by the Likeability subscale (22 true-false items); Conscientiousness was measured by the Prudence subscale (31 true-false items); Emotional Stability was measured by the Adjustment subscale (37 true-false items); and Openness was measured by two subscales, Intellectance (25 true-false items) and School Success (14 true-false items) (Caligiuri, 2000).	Caligiuri (2000) Jacobs, Conte, Day, Silva, & Harris (1996) Hayes et al (1994) Tett et al (2003)
House-Developed Personality Measures[1]	
Thirty items for Conscientiousness (e.g., "I put a great deal of effort into my work;" "others have described me as a very disciplined	Barrick & Zimmerman

person;") thirty items for Emotional Stability (e.g., "I become irritated when others criticize me;" "I tend to get over embarrassing situations very quickly.")	(2009)
Bergman et al (2008) used the personality test which was developed based on the focused groups, existing validated tests in the organizational database, and a review of the literature on service and sales performance. These items were brief behavior descriptions. It uses four items to test openness (e.g., "I seek out new experiences whenever I can").	Bergman et al (2008)
Bledow and Frese (2009) used the four-item scale developed by Farh, Podsakoff, & Organ (1990) to measure Conscientiousness. Due to the insufficiency in Cronbach's alpha for the four-item scale, only a single marker item that best represented the construct was used ("I am one of the most conscientious employees of my workgroup.")	Bledow & Frese (2009)
Conscientiousness was measured using a measure developed for this organization and job; it included items to which respondents replied using a 7-point Likert scale ranging from 1= "strongly disagree' to 7 = "strongly agree."	Clevenger et al (2001)_Study 2
Grant et al (2009) asked participants to report their negative affect by responding to items from Daniels' (2000) measures of affect at work; participants rated how often they felt five specific emotions on a typical day at work (i.e., depressed, miserable, gloomy, bored, and dull) using a 5-point Likert-type scale anchored at 1 = "not at all" and 5 = "extremely."	Grant et al (2009)
LaHuis et al (2005) used 17 situational judgment and biodata items to measure overall Conscientiousness.	LaHuis et al (2005)
Researchers (Le et al., 2010) developed items to reflect three dimensions of the Big Five: Conscientiousness, and Emotional Stability; 14 questionnaire items were used to measure Conscientiousness (e.g., "others describe me as a highly dependable and reliable person") and 11 questionnaire items were used to measure Emotional Stability (e.g., "it is easy for me to remain calm in most situations"); employees responded to each questionnaire item on a 6-point Likert scale ranging from "strongly disagree" to "strongly agree."	Le et al (2010)_Study 1
ACT (2008) developed the personality measures based on the Big Five framework; conscientiousness is measured by summing three subscales: carefulness, discipline, and order; emotional stability is measured by the stability subscale; the resulting scales show good convergent validity (ACT, 2008): conscientiousness and emotional stability are correlated at .80 and .75 respectively with the corresponding scales of an established measure of Big Five personality, the Big Five Inventory (John & Srivastava, 1999).	Le et al (2010)_Study 2
Personality characteristics required for sales representative performance were identified in an attribute-oriented job analysis; items were written to tap all of the personality attributes identified as important in the job analysis; McManus and Kelly (1999) independently assigned each attribute to the Big Five factors; Extraversion (20 items) (sociable, assertive); agreeableness (34 items) (polished, tactful, considerate); conscientiousness (35 items) (achievement-oriented, conscientious, perseverance); emotional stability (24 items) (self-confident, well-adjusted); and openness to experience (11 items) (analytical).	McManus & Kelly (1999)
Shaw and Gupta (2004) used a single item that captures some markers (anxiety and tension) of negative affectivity : in the last year, how often did you feel nervous, fidgety, or tense" (1 = "never" to 4 = "often").	Shaw & Gupta (2004)
125-item inventory wherein each of the Big Five was measured by 25 items. Some comparisons have been done between this personality measure, which is developed by the consulting firm (Kenexa) and Goldberg's markers (Goldberg, 1992).	Weekley & Ployhart (2005) Weekley et al (2004)
Index of Psychological Well-Being (Berkman , 1971a, b; Wright & Bonett, 1992)	
This scale was designed to assess people's mental health on a single affective index. The Berkman scale uses many of the same items as Bradburn and Caplovitz' (1965) classic measure of affect, but with a more general or open-ended time horizon; subjects were asked how often they felt: 'very lonely or remote from other people,' 'depressed or very unhappy,' 'bored,' 'so restless you couldn't sit long in a chair,' 'vaguely uneasy about something without knowing why,' 'particularly excited or interested in something,' 'pleased about having accomplished something,' and 'on top of the world.'	Wright & Staw (1999)
International Personality Item Pool	

(IPIP; Goldberg, 1999)	
The IPIP is a 50-item instrument that measures the five-factor model, with 10 items for each personality factor. Each item was assessed using a 5-point scale that ranged from 1 = "strongly disagree" to 5 = "strongly agree"; IPIP shows high convergent validities (.84) or higher with existing measures of personality and the FFM (e.g., CPI, NEO-PI-R, 16PF) (Goldberg, 1999).	Bajor & Baltes (2003) Griffin & Hesketh (2004)_Study 2, 3 Hui et al (2009) Ng et al (2008) Ployhart et al (2001) Shaffer et al (2006) Witt (2002) Witt & Ferris (2003)
Inwald Personality Inventory (IPI; Inwald,Knatz, & Shusman, 1983)	
IPI is a 310 item true-false questionnaire that was developed specifically for use by law enforcement agencies in selecting new officers. The IPI consists of 26 scales that include six specific external behavioral scales, five attitude and temperament scales, eight internal conflict scales, six interpersonal conflict scales, and one validity scale. The test attempts to assess the psychological and emotional fitness of recruits as well as some of their job-relevant behavioral characteristics. Cortina and his colleagues (1992) are the first attempting to link the IPI to the "Big Five."	Cortina et al (1992)
Mini-IPIP (Donnellan et al, 2006)	
Four items were used to measure each Big Five dimension. The participants indicated the extent to which each statement generally described themselves with response choices ranging from 1= "strongly disagree" to 5 = "strongly agree."	Grant & Wrzesniewski(2010) Tews et al (2010)_Study 1
Mini-Markers (Saucier, 1994)	
This is a brief version of Goldberg's unipolar Big-Five Marker. This scale consists of 40 adjectives (e.g., "bashful", "cooperative", "rude") assessing the Big Five personality factors (8 items for each dimension). All responses were made on a 7-point Likert Scale(1= "strongly disagree" to 7 = "strongly agree")	Bauer et al (2006) Conte & Gintoft (2005) Greguras & Diefendorff (2010) Orvis et al (2008) Small & Diefendorff (2006) Wallace & Chen (2006)
Minnesota Multiphasic Personality Inventory (MMPI; Butcher, 1979)	
Researchers (Costa et al., 1986; Johnson et al., 1984) have compared the content of MMPI items to the descriptions of the "Big Five" presented by Norman (1963) and concluded that the MMPI provided measures of four of the factors with Conscientiousness excluded.	Cortina et al (1992)
NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1989, 1991, 1992)	
NEO-FFI is a 60-item inventory rated on a 5-point Likert scale ranging from 0 = "strongly disagree" to 4 = "strongly agree." NEO-FFI is designed to give a quick (10 minutes), reliable, and valid test of the five domains of adult personality. Each factor is measured by 12 items.	Bing & Burroughs (2001)_Study 1

The reliabilities of NEO-FFI are adequate, with a mean of .78, and the NEO-FFI scales are substantially correlated with the NEO-PI-R scales.	Byrne et al (2005) Blickle et al (2009) Blickle et al (2010) Chan & Schmitt (2002) Crant (1995) Crant & Bateman (2000) Dirks & Skarlicki (2009) Erez & Judge (2001) Furnham & Fudge (2008) Hunthausen et al (2003) Kamdar & Van Dyne (2007) Motowidlo et al (2008) Ramo, Saris, & Boyatzis (2009) Salgado & Rumbo (1997) Tews et al (2010)_Study 2 Thoresen et al (2004) Van Scotter & Motowidlo (1996)
NEO-Personality Inventory (NEO-PI; Costa & McCrae, 1985; 1989)	
NEO-PI contains 181items. For the neuroticism, extraversion, and openness to experience domains, there are six 8-item facet scales designed to capture the qualities that subsumed by these domains. The agreeableness and conscientiousness domains are measured with global 18-item scales. Items are answered on a 5-point scale ranging from strongly 1= "agree" to 5 = "strongly disagreed." Hogan (1989) and Leong and Dollinger (1990) provided reviews on NEO-PI.	Cellar et al (1996) Piedmont & Weinstein (1994)
NEO Personality Inventory – Revised (NEO-PI-R; Costa & McCrae, 1992)	
NEO-PI-R is a 240-item Likert-type instrument that measures the FFM of personality. Individuals are asked to respond to questions about normal personality traits on a 5-point scale ranging from 1 = "strongly disagree" to 5 = "strongly agree." The NEO-PI-R generates 30 facet scales and five domain level scales (six facets for every one domain, with eight items per facet). NEO-PI-R has demonstrated utility in clinical, applied, and research settings (Costa, 1991; Costa, McCrae, & Holland, 1984; McCrae & Costa, 2003).	de Hoogh et al (2005) Griffin & Hesketh (2004)_Study 1 Kieffer et al (2004) Neuman & Wright (1999) Reid-Seiser & Fritzsche (2001) Robie & Ryan (1999) Stewart (1996. 1999)
Occupational Personality Questionnaire (OPQ; Saville & Holdsworth Ltd., 1998; Saville, Sik, Nyfield, Hackston, & MacIver, 1996)	
Following outcomes of factor analyses of the OPQ (Stanton & Mathews, 1991) and a procedure outlined by Nyfield, Gibbons, Baron, &	Clevenger et al (2001)

Robertson (1995), conscientiousness and extraversion scores were computed as a combination of six OPQ scales-detail conscious, conscientiousness, and forward planning for conscientiousness and outgoing, affiliative, and emotional control (reversed scored) for extraversion. The OPQ scores were converted to z-score and then combined to form conscientiousness and extraversion (Nyfield et al., 1995).	Witt (2002)
Occupational Personality Questionnaire (OPQ) Concept Model 4.2 (Saville & Holdsworth Ltd. 1998)	
OPQ is a 248-item measure of work-related personality characteristics and consists of 31 eight-item scales.	Barrick et al (2002) Witt (2002)
O'Connell	
The personality items yielded five scale scores: Conscientiousness, Agreeableness, attention to detail, locus of control, and positive affectivity. All personality items were single statements to which the respondent used a sliding pointer to indicate agreement or disagreement; these items were continuous variables with a range from 1 = "strongly disagree" to 5 = "strongly agree." Based on a normative sample of over 3000, individual scale reliabilities ranged from .65 to .88 (O'Connell & Kato, 2001). These personality scales have been used in other studies and more detailed descriptions can be found in those studies (cf. O'Connell & Smith, 1999, 2000; Hattrup et al., 2005; Bott et al., 2007).	Hattrup et al (1998) O'Connell et al (2007)
Personality and Leadership Profile (PLP; Hagberg Consulting Group, 2002)	
PLP is a self-report measure of personality. PLP is composed of 342 self-referent statements; participants indicate the degree to which the statement applies to them using a 4-point Likert scale.	Strang & Kuhnert (2009)
Personal Characteristics Inventory (PCI; Mount & Barrick, 1995)	
PCI is based on Five-Factor Model of Personality. It consists of 120 items. Participants rated each item on a three-point, Likert-type scale (from 1 = "disagree" to 3 = "agree"). In addition to high internal consistency (.87) and high test-retest reliabilities (.77, .83, .84 with 4-, 6-, 9-months intervals respectively), evidence has demonstrated this measure's convergent validity and divergent validity with other FFM measures (e.g., Mount et al., 1999), including Goldberg's Adjective Checklist (1992).	Barrick & Mount (1993; 1996) Barrick et al (1996) Burke & Witt (2002) Clevenger et al (2001) Colbert & Witt (2009) Ferris et al (2001) Mount et al (1999) Mount et al (2008) Witt et al (2004)
Personality Research Form (PRF; Jackson, 1984)	
PRF, a psychological test consisting of 22 scales with 16 items, has been extensively studied psychometrically. This measure was modified by having subjects indicate their agreement with each statement using an expanded four point scale consisting of the choices of Very True, True, False, and Very False (instead of the True/False response categories in the PRF). PRF was not originally developed as an FFM measure (Jackson, Paunonen, Fraboni, & Goffin, 1996) yet its subscales were successfully reinterpreted in terms of the FFM. PRF is one of the most highly cited personality inventories (Mitchell, 1983); its excellent psychometric properties have been repeatedly acknowledged (e.g., for reviews, see Anastasi, 1972; Kelly,1972), as has its validity in personnel selection applications (e.g., Gellatly et al., 1991; Goffin et	Goffin et al (1996) Marcus, Goffin, Johnston, & Rothstein (2007) Wright et al (1995)

al., 1995; Rothstein et al., 1994).	
Personality Style Inventory (PSI; Lounsbury & Gibson, 2001)	
The PSI is a normal personality inventory contextualized for work settings and validated in terms of job performance and satisfaction for a wide range of jobs. Scale development, norming, reliability, criterion-related validity, and construct validity information for the PSI can be found in Lounsbury & Gibson (2001). Loveland et al (2005) measured Agreeableness, Conscientiousness, Emotional Resilience (the inverse of neuroticism), and Extraversion	Loveland, Gibson, Lounsbury, & Huffstetler (2005)
Police Personality Questionnaire (PPV; Van Leeuwen, 2000)	
Comparing with NEO-PI-R, PPV showed observed construct validity coefficients between .17 and .58 (N=160).	De Meijer et al (2008)
Positive Affect and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988)	
PANAS consists of 10 positive affect (PA) and 10 negative affect (NA) adjectives that participants completed to indicate the extent to which they "generally [feel] each feeling, that is how [they feel] on average". Internal consistency (alpha) and test-retest reliability are high for both the PA and NA scales. NA is highly correlated with measures of Big Five Neuroticism (i.e., r = .58) (Watson, Wiese, Vaidya, & Tellegen, 1999). PANAS measure has been validated as both a trait and state measure of affect (Watson et al., 1988). Only papers used PANAS to measure positive/negative disposition (not positive/negative mood) were included in the meta-analysis.	Cropanzano et al (1993) Fisher (2003) Hochwarter et al (1999) Shaw & Gupta (2004)_ Study 2 van Yperen (2003)
Rational Biodata Inventory (RBI; Kilcullen et al., 2005)	
RBI is a personality measure that uses biodata-like items. Van Iddekinge et al (2009) used RBI to measure Extraversion. An item similar to the eight items that comprise extraversion scale would be "How difficult has it been for you to start a conversation with people you don't know very well?"	Van Iddekinge et al (2009)
Sixteen Personality Factor Questionnaire (16PF; Cattell, Eber & Tatsuoka, 1970, 1993; Conn & Rieke, 1994)	
Computerized 16PF, Fifth Edition (Cattell, Cattell, & Cattel, 1993), contains 185 items that can be mapped onto 16 primary factors and/or five global factors: introversion /extraversion (likened to extraversion), low anxiety/high anxiety (likened to neuroticism), tough-mindedness/receptivity (likened to openness), independence/accommodation (likened to agreeableness), and low self-control/high self-control (likened to conscientiousness). PRF was not originally developed as an FFM measure (Conn & Rieke, 1994) yet its subscales were successfully reinterpreted in terms of the FFM.	Bergman et al (2006) Bergman et al (2008)_Study 2 Bing & Lounsbury (2000) Jenkins & Griffith (2004) Marcus, Goffin, Johnston, & Rothstein (2007)

Traits Personality Questionnaire (TPQue; Tsaousis, 1999)	
TPQue is a Greek measure of the FFM.	Nikolaou (2003)
Trait Self-Description Inventory (TSDI; Collis & Elshaw, 1998; Roberts, Zeidner, & Matthews, 2001)	
TSDI measures the Big Five personality dimensions (Tupes & Christal, 1961). TSDI consists of 172 items in two sections, the first containing 62 trait descriptive adjective to which the participant responds using a seven point scale; the second section contains110 statements to which the participants responds using a nine point scale	Perkins & Corr (2006)
Work Behavior Inventory (WBI; Page, 2007)	
The WBI is a 240-item work-oriented personality instrument comprised of 20 scales, 18 of which are 12-item facet-level personality scales that map onto the Big Five Personality traits. The WBI User's Manual (Page, 2007) details extensive content, criterion-related, convergent, and discriminant validity evidence for the WBI.	Oh & Berry (2009)

1. The "House-Developed Personality Measures" refer to the personality measures either developed for particular job or for particular organization. All the "House-Developed Personality Measures" used Big Five dimensions to name the personality traits under investigation.

APPENDIX C1

VARIATION WITHIN PERSONALITY MEASURES

Personality Measure	Variation	Why	Paper
BFI	BFI-K (Rammstedt & John, 2005) is a German adaptation of the BFI (John et al., 1991). BFI-K comprises 21 items. Openness to experience is assessed by five items; the other traits are assessed by four items each.	Items in BFI-K showed a high degree of work-specific contextualization; BFI-K showed high convergent validity with the NEO-PI-R and bipolar adjective rating scales (BARS).	Blickle et al (2009)
Big Five Marker	The inventory was shortened from 100 to 50 adjectives; keeping the items with the largest factor loadings reported by Goldberg (1992); the construct validity of the shortened scales was verified through undergraduate students.	Organization imposes time constraints on researchers	Mount et al (1994)
Mini-Markers	The employees were asked to rate themselves once in general and once as they are at work. For the work-specific measure, participants were instructed to think about how they behave at work ("Describe yourself as you are at work") (Hunthausen et al., 2003).		Small & Diefendorff (2006)
HPI	HPI Form-S (Hogan, 1990) is a 115-item measure that contains scales that assess the Big Five personality dimensions. The subscales that make up the HPI Form-S represent those with the highest loadings from the full HPI.	Form-S retains the structure of the full HPI with approximately half the number of items.	Conte & Jacobs (2003)
IPIP	Rather than using ten items for each personality factor (as what the standard IPIP does), the authors used five items to measure Conscientiousness and four items to measure the rest personality dimensions respectively; each scale demonstrated a reasonable reliability, similar to those obtained by Goldberg (1999).	Researchers concern about parsimony of the measures.	Sawyerr et al (2009)
PANAS	In addition to the ten positive affect terms from the PANAS (Watson et al., 1988), four terms representing hedonic components—cheerful, delighted, happy, and joyful—were added.	This revision follows Watson & Clark's (1997) suggestion, a response to the criticism that PANAS does not fully capture the hedonic aspects of individuals' moods (Larsen & Diener, 1992; Wright & Staw, 1999).	Tsai et al (2007)
PCI	Burke & Witt (2002) asked participants to rate each item on a three-point Likert-type scale (from 1 = "disagree" to 3 = "agree"); whereas Mount et al (2008) asked participants to rate each item on a five-point Likert scale (from 1 = "strongly disagree" to 5 = "strongly agree").		Burke & Witt (2002) Mount et al (2008)
PRF	Achievement need (i.e., Conscientiousness) was measured with a modified version of the 20-item scale from the Jackson Personality Research Form (PRF) (Jackson, 1974); this measure was modified by having subjects indicate their agreement with each statement using an expanded four point scale consisting of the choices of Very True, True, False, and Very False (instead of the True/False response categories in the PRF).		Wright et al (1995)

APPENDIX C2

PERSONALITY TRAITS RATED BY OTHERS

Personality Measure	By Whom	Why	Paper
Goldberg	Coworkers and spouses	To mitigate problems of common method variance. Also, personality ratings by close others have equal or better construct validity than self-ratings, especially when there are multiple sources of those ratings (Kolar, Funder, & Colvin, 1996)	Shaffer et al (2006)
IPIP	Supervisor	To examine the usefulness of observer-rating method, an alternative measure of personality found in Connolly, Kavanagh, and Viswesvaran's (2007) meta-analysis: while observer-rating may introduce noise to the data, thereby increasing Type II error, it would provide a conservative and therefore more plausible test of the correlation under study by avoiding the common source error	Hui et al (2009)
Mini-Marker	Supervisor and coworkers		Small & Diefendorff (2006)
NEO-PI	Coworkers	To reduce potential social desirability, faking, and impression management bias (Barrick et al., 2001; Mount et al., 1994; Organ et al., 2006)	Kamdar & van Dyne (2007)
NEO-PI-R	Applicants and incumbents	To compare the coefficients (Everett &Entrekin, 1980) for the five factors measured by NEO-PI-R in order to determine the similarity of the factors underlying personality responses obtained from applicants during the hiring process and from employees (Douglas, McDaniel, & Snell, 1996; McCrae & Costa, 1987; Schmit & Ryan, 1993)	Stewart (1999)

APPENDIX D

SUMMARY OF PERFORMANCE MEASURES ACROSS PRIMARY STUDIES

Performance = performance (composite) + performance (overall)	
-performance (composite): a performance appraisal form on eight dimensions was developed on the basis of job analysis (managers) -performance (overall): a summary evaluation of the manager's overall performance compared with work expectations	Barrick & Mount (1993)
-composite criterion: seven work performance dimensions (work effort, team playing ability, ability to work independently, tendency to think about Total Quality Process, positive attitude toward training, achievement orientation, and attendance); composite score was developed by averaging the seven work performance dimensions -overall performance: supervisor's global evaluation of each employee's work -supervisor made ratings on each dimension with the understanding that ratings were being used for research purpose only; ratings were made on a 5-point scale labeled as follows: 1 = "struggling," 2 = "falls below standards," 3 = "meets standards," 4 = "exceeds standards," and 5 = "outstanding."	Hayes et al (1994)
-performance evaluation includes twelve 16-point rating scales: quality, quantity, knowledge, versatility, judgment, communications, human relations, professionalism, responsiveness, punctuality, attendance, and overall performance -in addition to supervisor rating, the corporate records also included self-rated evaluations, which adopted the identical format to the supervisor-rated forms	Higgins et al (2007)-Study 3
-composite criterion: subjects are rated on a 5-point scale developed by the researchers (not part of subjects' normal performance appraisal process) ranging from 1 = "unsatisfactory" to 5 = "excellent" on 12 relevant performance items that constituted three performance scales: (1) interpersonal relations (items included "communicates ideas clearly," "relates well to supervisors," "team player," and "service minded"); (2) task orientation (included items "self-starter," "hard working," "detail skills," and "gets things done") ; and (3) adaptive capacity (included items "learns and adapts readily," "copes effectively with setbacks," "functions well in unstructured situations," and "plans, coordinate, and follows up work of others") -overall performance: a global rating of performance on a 4-point scale ranging from 1= "below average" to 4 = "excellent"	Piedmont & Weinstein (1994)
- performance (composite): job problem solving ability and job motivation, the result of the factor analysis based on nine performance dimensions -global job performance: measured by one nine-point scale	Salgado & Rumbo (1997)
-performance (composite): eight items were combined into a total performance scale (rated by supervisor) -performance (ranking): police executives were asked to rank from 1 to n for all police officers in the department	Sanders (2007)
-composite performance rating: four dimensions to assess employee achievement or performance of the social welfare personnel samples: work facilitation, goal emphasis, support, and team building; the four dimensions were summed to form a composite measure of performance -global performance rating: supervisor was asked 'overall, how would you rate this employee's performance at this time"; a 5-point response scale was provided with ratings ranging from 'poor' to 'excellent'	Wright & Staw (1999)
Performance = performance (overall)	
-participant performance was rated by the firm's top management team on a scale of 1 (rarely or never meets expectations/red flag) to 5 (consistently exceeds expectations/top performer/leader	Anderson et al (2008)
-supervisory assessment of overall performance on a scale from 0.0 to 4.0	Bajor & Baltes (2003)

-overall performance rating: three-items on a 7-point scale from 1 = "very poor" to 7 = "very good;" rated by supervisor	Bergman et al (2006)
-overall job performance: averaged from three items: (1) how would you describe this employee's overall job performance; (2) what is the employee's value to the organization; (3) how effectiveness is this employee in his/her job? Each item had a 7-point scale	Bergman et al (2008)_Study 2
-overall performance rating: raters, supervisor, peer, and subordinate, each made a rating of overall effectiveness for the ratee on a nine point scale (1 = "needs substantial improvement," 3 = "needs moderate development," 5 = "effective," 7 = "very effective," and 9 = "extremely effective"); in addition to the correlation between personality and supervisory rating, average peer ratings, and average subordinate ratings, an average over the supervisor rating, the average peer rating, and the average subordinate rating was computed to represent a "combined performance ratings"	Berry et al (2007)
-performance (overall): three-items developed by the researchers on expatriate managerial job performance were rated both by home- and by host-country bosses: (1) this person is effective in his expatriate role; (2) this person has done what was expected of him on this expatriate assignment; and (3) this person is achieving the company's goals during his expatriate assignment	Dalton & Wilson (2000)
-supervisors rated employees' overall job performance on a five-item scale (see Ashford & Black, 1996). The items were introduced with the statement, "Thinking about the overall performance of the person you are rating, please indicate how you would rate them relative to others in the same/similar jobs on a percentage basis." The items, which used a 9-point scale anchored at 1 = "bottom 10% " and 9 = "top 10%," included "overall performance" and "achievement of work goals"	Grant et al (2009)
-overall job performance: one-item rating "overall, considering the employee's performance in the full range of day-to-day activities, as well as his or her overall contribution to the organization, its customers, and its employees, he or she performs …"	Lahuis et al (2005)
-global rating	Mabon (1998)
-participants self-rated their own job performance in the past year on a scale from 0 = "very poor performance" to 100 = "perfect performance"	Shaw & Gupta (2004) _ Study 1, 2
-overall job performance: four-item scales developed by MacKenzie, Podsakoff, & Fetter (1991): (1) overall, I would rate this individual as one of my department's best employees; (2) generally speaking, I am pleased with this employee's performance; (3) I consider this person to be one of the department's most valuable employees; and (4) all things considered, this employee is outstanding; each item was followed by a scale ranging from 1 = "strongly disagree" to 7 = "strongly agree"	Van Yperen (2003)
Performance = performance (overall) + contextual performance	
-overall job performance score: Robertson et al (1999; 2000) -OCB: Smith et al.'s (1983) measure assessing altruism and generalized compliance or conscientiousness	Nikolaou (2003)
Performance = task performance + contextual performance	
-task performance: five-item measure (quantity, quality, job knowledge, problem solving, and effort) -interpersonal performance: four-item measure (interpersonal skill, cooperation, communication, and customer service) -ratings were made on a 6-point scale (from 1 = "somewhat below requirements" to 6 = "consistently exceeds requirements") -performance measures (both task and interpersonal performance) were developed for the purpose of this study; both task and interpersonal performance were rated by supervisor and peer	Barrick et al (2005)
-task performance: ten items developed based on the theory of Scullen et al (2003) (e.g., "[Employee's name] uses available resources very effectively and in a well-planned manner") -contextual performance: eleven items developed based on the theory of Scullen et al (2003) (e.g.,"[Employee's name] inspires co-workers to achieve higher goals without overstraining them") -managers' supervisors responded to the items on a 5-point Likert scale ranging from 1 = "very inaccurate" to 5 = "very accurate"	Bergner et al (2010)
-overall performance: measured with three items developed by Motowidlo & Van Scotter (1994); for each item supervisors made their ratings on a seven-point scales; behavioral anchors for the lower (1,2), middle (3-5), and upper (6,7) range of the scales were used; a sample	Bledow & Frese

item asked whether the employee contributes less, an average amount, or more to the performance of the department than most other members -helping: five items of the scale developed by Organ & Konovsky (1989) and adapted by Van Dyne & LePine (1998) (e.g., "I am always willing to help and support others.") -both participants and supervisors rated on the "helping" -the correlation between performance and helping behavior that were rated by supervisor: .63	
-task performance: four items -contextual performance: four items; the rating anchors ranged from 'a great deal better than other persons in a comparable position'(1) to 'much worse than other persons in a comparable position,'(-1) with 'better than,' 'as good as,' and 'worse than' as intermediate anchors -because the sample jobs varied in domains and job performance demands typically differ within the same domain from job to job, the importance of each performance facet was directly assessed by the assessors; the rating of how well a job incumbent performs in a given domain was weighted by the importance rating of the respective aspect	Blickle, Momm, Schneider et al (2009)
-overall job performance, as well as the three performance dimensions, namely, core technical proficiency (i.e., task performance), job dedication (i.e., motivational contextual performance), and interpersonal facilitation (i.e., interpersonal contextual performance), were assessed using supervisory rating items developed by David Chan -three items for task performance (problem analysis, written communication, and oral communication); three items for job dedication (motivations to perform, to learn, and work hard); three items for interpersonal facilitation (interpersonal conflict resolution, negotiation, and teamwork and cooperation); all items for the three performance dimensions were rated on a 5-point Likert-type scale with anchors ranging from 1= "very strongly disagree" to 5 = "strongly agree" -overall job performance was measured using a single-global indicator item "this officer performs very well on his/her job," rated on the same 5-point scale	Chan & Schmitt (2002)
-task performance: five-item scale adapted from McCarthy & Goffin (2001) (e.g., (1) effectiveness in displaying job knowledge and skill, (2) effectiveness in verbal and written communication, (3) effectiveness in taking charge when required, (4) degree to which they set high standards and strive to meet them, and (5) quickness in learning) on scales of 1, "strongly below average," to 7, "strongly above average" -OCB: sixteen-item scale from Lee & Allen (2002), eight of which assess OCBI (individual) (e.g., "help others who have been absent") and eight of which assess OCBO (organization) (e.g., "defend the organization when other employees criticize it"); supervisors indicated the degree to which employees engaged in 16 behaviors at work on scales of 1 = "not at all" to 5 = "very much" -correlations between performance measures: task performance with OCBI (.60), with OCBO(.65)	Cote & Miners (2006)
-in-role performance: nine items developed by Goodman & Svyantek (1999) (e.g., "demonstrates expertise in all job-related tasks", "achieves the objectives of the job") -extra-role performance: seven items developed by Goodman & Svyantek (1999) (e.g., "willingly attends functions not required by the organization, but helps in its overall image", "takes initiatives to orient new employees to the department even though not part of his/her job description") -both in-role and extra-role performance were rated by participants' colleagues on a seven-point scale with 1 = "not at all characteristics" and 7 = " totally characteristic" -correlation between in-role performance and extra-role performance (.76)	Demerouti (2006)
-core task performance/job dedication/interpersonal facilitation: fifteen items based on the results of job analysis (i.e., interviewing job incumbents, their managers, appropriate human resources representatives, and customers of the programmers about the job and work environment) -overall job performance: one item assessed overall job performance; the scale ranges from 1 = "weak or bottom 10%" to 5 = "best or top	Ferris, Witt, & Hochwarter (2001)

10%" -correlations between performance measures: overall job performance with task performance (.83), with job dedication (.82), with interpersonal facilitation (.74) -correlation between task performance and job dedication (.68) ; correlation between task performance and interpersonal facilitation (.77)	
-job performance both at Time 1 and Time 2 (two weeks apart) were measured with the same set of items; six items to assess core technical or in-role aspects of performance (e.g., typical quantity of performance, quality of performance, effectiveness, performance relative to the workgroup, effort, and job-related knowledge and skills); items were summed to produce the job performance score -citizenship behavior: assessed at Time 1 only by items similar to those in Smith et al (1983); respondents used a five-point scale to rate the frequency with which they performed five types of actions: volunteering to learn new tasks, helping colleagues with heavy workloads, orienting newcomers, doing extra tasks, and providing extra help to customers/outsiders); items were summed to produce the OCB score -correlation between Time 1 task performance and OCB (.31); correlation between Time 2 task performance and OCB (.33) -rated by participants	Fisher (2003)
-in-role performance: supervisors rated in-role performance using Williams and Anderson's (1991) 7-item measure; a sample item includes "adequately completes assigned duties" and is rated on a scale ranging from 1 = "strongly disagree" to 7 = "strongly agreed" -OCB: supervisors evaluated participants' OCB using Podsakoff, MacKenzie, and Fretter's (1993) 20-item measure; this scale measures five types of OCBs: altruism, courtesy, conscientiousness, sportsmanship, and civic virtue, which are concluded as best considered indicators of an overall OCB factor based on two recent meta-analyses (Hoffman, Blair, Meriac, & Woehr, 2007; LePine, Erez, & Johnson, 2002); all items were rated on a scale ranging from 1 = "strongly disagree" to 7 = "strongly agree;" Given the non-Western sample utilized in this study, the item "tends to make mountains out of molehills" was clarified by including (i.e., "tends to make things bigger or worse than they are") -the correlation between in-role performance and OCB is .61	Greguras & Diefendorff (2010)
-in-role performance: three items adopted from Van Dyne & LePine (1998); supervisors indicated on a seven-point Likert scale ('strongly disagree' to "strongly agree') the degree to which the employee (1) meets performance expectations, (2) fulfills the responsibilities in his/her job description, and (3) performs the tasks that are expected as part of the job; rated by supervisor -helping behavior: subjects were provided with a roster of coworker names and asked to indicate who they helped and who helped them with tasks that go beyond formal job descriptions; helping was coded dichotomously and operationalized as the number of others who indicated the individual helped them	Johnson & O'Leary-Kelly (2003)
-task performance: six-item scale developed by Van Dyne & LePine (1998) -helping (superior): seven-item scale developed by Van Dyne & LePine (1998) -helping (peers): seven-item scale developed by Van Dyne & LePine (1998); rated by peers -correlations between measures: task performance with helping (superior) (.33), with helping (peers) (.27)	Kamdar & Van Dyne (2007)
-based on meetings with both camp counselors and camp administrators, along with a thorough job analysis, two core dimensions were identified, task performance and social performance; job performance ratings were made on these two dimensions using an eight-point rating scale from 1 = "performance does not meet, or rarely meets, minimum job standards" to 8 = " single best performance I have ever observed or even hope to observe"	Loveland et al (2005)
-task performance: consists of three items (prospecting, selling, and closing, which represent the core of the job) -contextual performance: consists of two items (demonstrating effort and maintaining personal discipline) -correlation between performance measures: (.69)	McManus & Kelly (1999)
-job performance: a short measure used in Robertson et al (1999, 2000) as an overall job performance score -OCB: using Smith et al.'s (1983) measure assessing altruism and generalized compliance or conscientiousness	Nikolaou (2003)

-correlation between job performance and OCB-altruism (.74); between job performance and OCB-conscientiousness (.44)	
-task performance: six items measuring technical knowledge and problem solving -contextual performance: six items measuring leadership, teamwork, and positive attitude -correlation between performance measures: (.64)	O'Connell et al (2007)
-seventeen managerial performance competencies were classified into task performance and contextual performance by the authors; managerial task performance included competencies mainly related to getting things planned, organized, done, and controlled (e.g., results driven, problem analysis, process management), and contextual performance included competencies mainly related to supporting the social and psychological contexts of work (e.g., team building, coaching/mentoring, negotiating resolution) -rated by superior, peer, subordinate, and self -correlation between measures: task performance with contextual performance (.89 for supervisor ratings; .88 for peer ratings; .89 for subordinate ratings; .82 for self ratings)	Oh & Berry (2009)
-two-item scale for task performance (e.g., "fulfilling the requirements of the position") and four-item scale for contextual performance (e.g., "maintaining good working relationships with host nationals") developed by Caligiuri (1997); all performance items were recorded on a 5-point rating scale ranging from 1= "poor" to 5 = "outstanding" -correlation between performance measures: contextual performance and task performance (.53) -self-rated and co-worker rated	Shaffer et al (2006)
-in-role: measured by seven scales developed by Williams & Anderson (1991) on a 7-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree") -OCB: twenty-four items developed by Podsakoff et al (1990) measured five dimensions of OCB (i.e., altruism (helping others), conscientiousness (going above and beyond expectations), sportsmanship (not complaining), courtesy (preventing problems from others), and civic virtue (responsible participation in organizational life) (Organ, 1988); five sales were combined into one as the measure of OCB to simplify the interpretation and presentation of findings; raters evaluated the extent to which they agree with the statements regarding the focal employee's behaviors on a 7-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree") -both coworkers and supervisors rated OCB and in-role behavior -correlation between supervisor in-role and OCB (.70), correlation between coworker in-roe and OCB (.63)	Small & Diefendorff (2006)
-overall performance: averaging over scores on eight performance dimensions obtained from the organization (accuracy, ability to work with others, grooming, attendance, punctuality, productivity, attitude, and ability to take orders); each employee was rated by his or her immediate supervisor who used a scale rating from 1 = "excellent" to 5 = "poor" for each item; the organization uses the average of the eight scores as a measure of overall performance -citizenship, dependability, and work output: these three dimensions were the result of a factor analysis based on the eight performance dimensions -correlations between performance measures: overall performance with citizenship (.67), with dependability(.68), with work output (.60)	Stewart & Carson (1995)
-service performance: three items were developed for this research and were based on organization's performance appraisal (e.g., "the employee is responsive to guests' needs") -interpersonal facilitation (four items; e.g., "this employee helps others who have heavy workloads") and job dedication (five items; e.g., "this employee adheres to informal rules devised to maintain order") were measured by items developed by Williams and Anderson (1991) -correlation between interpersonal facilitation and job dedication (.46) -correlation between service performance and interpersonal facilitation (.68); correlation between service performance and job dedication (.48)	Tews et al (2010)_Study 1
-task performance (self-rated goal attainment): self report the level of goal achievement (in percentage)	Tsai et al (2007)

-task performance (supervisor rating): eight items from Wayne & Liden (1995) and Wayne, Liden, Graf, and Ferris (1997) -helping other coworkers: measured by three items from Coleman and Borman (2000) and one item from Organ and Konovsky (1989); self-rated -coworker helping and support: four items from Podsakoff, Ahearne, and MacKenzie (1997); rated by coworkers -correlation between performance measures: self and coworker rating on helping behavior (.37), self and supervisor rating on task performance (.49)	
-overall rating: three overall performance measures ("whether the ratee exceeded, met, or did not meet standards for job performance;" "whether the ratee performed at a low, average, or high level in comparison to others of the same rank;" and "whether the ratee contributed less, an average amount, or more to unit effectiveness than others in the work unit"); the overall rating was computed as the sum across these three ratings -task performance: factor analysis (based on eleven task items developed in Project A (Campbell, 1986)) derived six items (inspecting, testing, and detecting problems with equipment; performing routine maintenance; repairing; using tools and/or test equipment; operating equipment; and overall technical performance); supervisors used a 5-point scale anchored by "much below average" to "much above average" to indicate how effective the ratees were; task performance score was computed as the sum across the six ratings -interpersonal facilitation: factor analysis (based on 13 items) derived seven items; the sum of these seven ratings as the interpersonal facilitation score -job dedication: factor analysis (based on 13 items) derived eight items: the sum of these eight ratings as the job dedication score -correlations between performance measures: overall rating with task performance (.56), with interpersonal facilitation (.44), with job dedication (.54); task performance with interpersonal facilitation (.35), with job dedication (.48)	Van Scotter & Motowidlo (1996)
Performance = task performance + contextual performance + adaptive performance + CWB + withdrawal behavior/Safety Issues	
-job performance: measured by six items, out of which, two measure important aspects of task performance (e.g., "how fast does this person usually complete her tasks" "how is the quality of this person's performance altogether"), two for adaptive performance (e.g., "how successful is this person in dealing with unforeseen and/or unexpected events (disturbances, interruptions, losses/deficiencies, crises, stagnations) in her job activity generally" "how well does this person adjust herself to changes and innovations"), and two for contextual performance (e.g., "how sociable does this person act in cooperation with others" "how reliably does this person meet work-related commitments and agreements") (Schmitt, Cortina, Ingerick, & Wiechmann, 2003); the rating anchors ranged from "a great deal better than other persons in a comparable position" to " much worse than other persons in a comparable position," with "better than," "as good as," and "worse than" as intermediate anchors; for each item, raters also had the opportunity to choose the option, "can't say." - because participants are from different job domains (e.g., social, enterprising, and conventional), the importance of each performance facet was also assessed the rating of how well a job incumbent performed in a given domain was weighted by importance rating of the respective aspect -the study reported an aggregated score	Blickle et al (2008)
-job performance: assessed with an overall job performance measure from Blickle et al (2008); out of which, two items measured adaptive performance, two items measured task performance, and two items for contextual performance, which is further separated into interpersonal facilitation and job dedication; as the scale was designed to sample performance ratings from jobs in varying domains (e.g., social, enterprising, and conventional), the performance ratings are carried out in reference to persons in comparable positions; the rating of how well a job incumbent performs in a given domain is weighted by the importance rating of the respective aspect	Blickle, Momm, Kramer et al (2009)
-performance index: an overall combined scale on four factors: task performance, OCB, CWB, and safety	Casillas et al (2009)
-performance: annual rating on one item measuring the overall performance level -development: annual rating on one item measuring the prosper of continuous development	Furnham et al (1999)

-correlations between performance measures: (.29)	
-task performance: three items developed by Borman & Motowidlo (1997) -adaptive performance: eighteen items developed by Pulakos, Arad, Donovan, & Plamondon (2000)	Griffin & Hesketh (2004)_Study 1
-task performance: five items developed by Borman & Motowidlo (1997) -adaptive performance: twenty items developed by Pulakos et al (2000)	Griffin & Hesketh (2004)_Study 2, 3
-task performance: seven-item scale developed by Williams and Anderson (1991) with the wording changed to reflected work group duties and responsibilities -citizenship behavior: sixteen-item scale developed by Lee and Allen (2002) -counterproductive behavior: nine-item scale developed by Robinson & O'Leary-Kelly (1998) -withdrawal behavior: ten-item scale developed by Lehman & Simpson (1992) -correlations between measures: task performance with citizenship behavior (.20), with counterproductive behavior (-.18), with withdrawal behavior (-.26)	Jackson et al (2006)
-items were developed based on analysis of the frequencies of the behaviors reported in the pilot study; data were collected for the research purpose only -task performance: 6 items -OCB: 12 items -CWB: 14 items -for each item, supervisors were provided with a number of representative behaviors and asked to rate how frequently participants could be observed to exhibit such behaviors at work on a rating scale from 1 = "never" to 6 = "always;" for example, the "helping workers" item of the OCB subscale includes behaviors such as "assists other employees with their work when they have been absent," "supports coworkers with personal problems," and "takes times to listen to coworkers' problems and worries." -correlations between measures: task performance with OCB (.80), with CWB (-.63)	Le et al (2010)_Study 1
-rating scales used by the supervisors were developed by ACT to capture the three basic performance dimensions: task performance (7 items), OCB (4 items), and CWB (7 items); ratings for these performance dimensions were obtained by averaging the standardized items belonging to each dimension -correlations between measures: task performance with OCB (.68), with CWB (-.39)	Le et al (2010)_Study 2
-a total of 13 items that were relevant to the warehouse worker job were developed for research purpose only based on job description, observation, and interview with warehouse supervisors and human resource managers; five for task performance, four for OCBs and four for RC(CPBs) -task performance: five items based on job analysis (quantity of work, quality of work, problem solving, job knowledge, and communication/interpersonal skills) -OCB: four items based on job analysis (cooperation, organization citizenship, flexibility, and loyalty) -CPB/RC(rule compliance): four items based on job analysis (maintaining personal discipline, safety, punctuality, and following rules) -supervisory rating -correlation between task performance and OCB (.53)	Mount et al (2008)
- interpersonal relations, task orientation, and adaptive capacity: measured by twelve performance items -global rating: a four-point scale ranging from 1= "below average" to 4 = "excellent"	Piedmont & Weinstein (1993)
-safety performance: six items drawn from Burke, Sarpy, Tesluk, & Smith-Crowe 's (2002) general safety performance measure and Hofmann and Stetzer's (1996) safety scale -production performance: five items developed for this study	Wallace & Chen (2006)

-correlations between performance measures: (-.34)	
Performance = performance (composite) (developed for specific organization)	
-engineers' performance was measured by the number of jobs completed, his or her efficiency, and the number of errors committed	Anderson et al (2008)
-performance (composite): drivers were evaluated by their supervisor on nine dimensions on the basis of job analysis (quality of work, quantity of work, suitability for the position, personal appearance, attendance, dependability, driving skills, and oral and written communication skills); performance was evaluated on a 5-point Likert scale from "definitely unsatisfactory" to "outstanding"; overall performance was the mean of the ratings across the nine dimensions	Barrick & Mount (1996)
-similar to Mount et al (1999)_Study 2	Barrick et al (1993)
-performance (composite): telemarketing sales representatives were evaluated on eight performance areas (generating sales, quality of work, accuracy, length of telephone calls, availability to take calls, customer satisfaction, retaining customers, and following procedures) based on job analysis consisting of interviews, focus groups, and questionnaires -performance (overall): an overall job performance rating -a 7-point rating scale was used for these ratings, with response options ranging from 1= "far below expectations" to 7 = "greatly exceeds expectations" -overall performance was the mean of nine rating dimensions (eight performance areas plus one overall job performance rating)	Barrick et al (2002)
-performance (composite): employees were evaluated on nine dimensions on a five-point Likert scale ranging from "unsatisfactory" to "far exceeds expectations": quality of work, quantity of work, job knowledge, interpersonal skills, rule-following behavior, communication skills, initiative, punctuality, and customer service. Overall performance was the mean of the ratings across all dimensions	Barrick & Zimmerman (2009)
-overall job performance for national guardsmen: the composite score as a result of factor analysis based on 14 in-role performance items and one overall rating of subordinate job performance; the item response categories ranged from 1 = "performance does not meet, or rarely meets, minimum job standards" to 8 = "single best performance I have ever observed or even hope to observe;" the ratings for each performance dimension were averaged to form a unit-weighted composite score termed as overall job performance	Bing & Burroughs (2001)_Study 1
-overall job performance for camp counselor: twelve in-role job performance dimensions were derived based on job analysis information and one overall rating; response categories for these 13 items ranged from 6 = "very poor performers" to 1 = "outstanding"; prior to conducting all calculations and analyses the job performance ratings for all counselors were reverse scored such that higher scores reflected higher levels of performance; the ratings for each performance dimension were averaged to form a unit-weighted composite score termed as overall job performance	Bing & Burroughs (2001)_Study 2
-job performance (composite): ten important global performance dimensions (e.g., productivity, quality, attendance, relations with coworkers), which were summated to form a unit-weighted composite score termed as overall job performance	Bing & Lounsbury (2000)
-job performance (composite): thirteen items based on the results of an extensive job analysis overseen by an industrial psychologist and senior human resources generalists (e.g., "[Employee's name] finds creative and effective solutions to work problems"); the items were summed to yield a total performance score; the items were used for purposes of the research study only; supervisor rated employees on each item using: 1 = " weak or bottom 10 percent;" 2 = "fair or next 20 percent;" 3 = "good or next 40 percent;" 4 = "very good or next 20 percent;" and 5 = "best or top 10 percent;" these thirteen items were summed to yield a total performance score	Burke & Witt (2002)
-performance: rated on ten dimensions developed by the organization, which included: work ethics, willingness and ability to learn, ability to cooperate, dependability, effectiveness, leadership, willingness to adhere to policies and procedures, sales techniques, improvement over training/probationary period, and general performance; individuals were scored using a five-point response format (1= "unsatisfactory" to 5 = "excellent") -self-report	Byrne et al (2005)
-job performance (composite): nine items used for all technical and managerial positions on a 5-point scale ranging from 1 = "poor" to 5 =	Caligiuri (2000)

"outstanding" assessing the expatriates performance: technical knowledge, technical application, how well they carried out additional task activities, organizational commitment, how well they represented the organization to customers and the public, how well they maintained good working relationship, how effectively they communicated and kept others informed, motivation, and how well they facilitated team and peer performance	
-performance (composite): ten dimension based on job analysis that indicated that these were the critical performance areas; supervisors used behaviorally anchored rating scales to measure job performance of entry-level agents in a government agency	Clevenger et al (2001)_Study 1
-job performance was measured using supervisory ratings of 10 general performance areas for customer service employees, using behaviorally anchored scales, and using a graphic rating scale of 14 job skill areas; the 9-point scale for skill areas ranged from 1= "needs improvement" to 9 = "outstanding;" these 24 ratings were combined into a single composite	Clevenger et al (2001)_Study 2
-job performance was measured with nine behaviorally anchored rating scales that were completed by supervisors of the study participants; performance dimension to evaluate the performance of engineers included continuous process improvement, technical expertise, innovation and risk taking, problem solving, customer responsiveness, encouraging and valuing diversity, planning and priority setting, teamwork, and communication/openness/candor; a single measure of job performance was computed by summing these nine ratings (because all nine dimensions were highly correlated)	Clevenger et al (2001)_Study 3
-performance (composite): seven items based on the results of job analysis and in consultation with line managers and human resources officials for line managers (e.g., [employee name] consistently produces a high quantity or volume of work) -the supervisors used the following scales: 1 = "weak or bottom 10%," 2 = "fair of next 20%," 3 = "good or next 40%," 4 = "very good or next 20%," and 5 = "best or top 10%"	Colbert & Witt (2009)
-performance (composite): train operator performance was measured on three dimensions (attendance/dependability, schedule adherence, and vigilance/attentiveness) , which were standardized and summed to form the performance composite; train operators were rated on a 7-point Behaviorally Anchored Rating Scales (BARS), ranging from 1 = "low performance" to 7 = "highly performance;" multidimensional criterion measures are not expected to have the same level of reliability as uni-dimensional predictor tests that are made up of highly interrelated items (Schmitt, 1996)	Conte & Jacobs (2003)
-performance evaluations for the hospital nurses were taken on a multidimensional graphic ratings scale; nurse received points for their score on each dimension; since the dimensions were highly inter correlated, the hospital summed the points to form a composite score ranging from 1 to 170	Cropanzano et al (1993)_Study 1
-overall performance evaluation is obtained through averaging scores over three separate components: (1) one rating based on five performance dimensions; (2) on rating on global job accountability; and (3) one rating for success in attaining quarterly performance goals	Cropanzano et al (1993)_Study 2
-performance appraisals were gathered from supervisors adapting the six situational interview question scales into performance dimensions; the six scores were combined to form an overall customer service performance	DeGroot & Kluemper (2007)
-performance (composite): nineteen-item Resident Assistant Evaluation Form (RAEF) (Deluga & Masson, 2000) was used to evaluate the performance of RA by the resident students; residents responded on a 4-point Likert scale ranging from strongly disagree (scored 1) to strongly agree (scored 4); scores were determined by averaging the 19 items; sample items include "appears to show a personal interest in the residents", "is respected by residents", "promotes an academic atmosphere", "is fair and consistent in dealing with policy violation", "responds appropriately to residents' concerns", "visits with residents", and "helps to initiate activities with residents"	Deluga & Masson (2000)
-general performance /overall performance: general performance and overall performance were highly correlated (.89), therefore they were combined to form a composite performance variable called "composite/overall performance"; general performance consists of nine performance dimensions; overall performance is obtained through supervisory rating on individual effectiveness on a one to nine Likert-type scale ranging from "needs improvement" to "outstanding"	Fallon et al (2000)
-nine performance dimensions (work practices and procedures, planning and problem solving, monitoring and controlling, group cooperation	Goffin et al (1996)

and cross-functional management, promoting safety, communication, personnel development, customer and supplier relations, and personals work style) and one overall performance rating; all ratings were made with the Relative Percentile Method (RPM); RPM approach requires that ratings be made on 101-point scales, where 50=average; for each performance dimension, all of the ratees are considered relative to one another and rated on the 0-to-100 scale -"total performance": unit-weighted composite of nine performance dimensions and overall performance rating	
-performance (composite): employees were rated by immediate supervisor on five categories: productivity and quality, safety and housekeeping, human relations, responsibility and personal development, and dependability and responsiveness	Higgins et al (2007)_Study 4
-performance (composite): criterion items were developed based on job analysis for each sample; the result of the analyses conducted on the combined data across four samples (as the results were similar across samples)	Hochwarter et al (2000)
-overall performance appraisal: rated by supervisor on 16 different aspects; retrieved from company record; rated a year before the current study -task performance: nine items made after consulting Tsui, Porter, & Egan's work (2002) by Hui et al (2009); each item was rated using a 5-point Likert scale (1 = "worse than others" to 5 = "better than others")	Hui et al (2009)_ Study 3
-overall rating: averaging the nine performance ratings to obtain the composite score, an indicator of bus operator effectiveness	Jacobs et al (1996)
-performance appraisal: accountants were rated on thirty-one items covering nine dimensions of performance including work habits, written communication, verbal communication, quality of work, quantity of work, job knowledge, client relations, supervisory responsibilities and cooperative/team work	Jenkins & Griffith (2004)
-performance appraisal: accountants were rated on thirty-one items covering nine dimensions of performance including work habits, written communication, verbal communication, quality of work, quantity of work, job knowledge, client relations, supervisory responsibilities and cooperative/team work	Jenkins & Griffith (2004)
-supervisory rating on 10 different job performance domains using a 5-point Likert-type scale ranging from 1 (well above average) to 5 (well below average): ability to (1) express oneself orally, (2) comprehend written information, (3) express oneself in writing, (4) work effectively with other people, (5) reason clearly, (6) recall current job information, (7) pay attention to many details at once, (8) conform to commonly accepted standards of behavior, (9) overcome obstacles in accomplishing work, and (10) adapt to changes in work demands; as each participants was evaluated on only those dimensions that were critical to satisfactory job performance, an average job performance score was computed -work quality was assessed by six questions answered on a 5-point Likert-type scale ranging from 1= "well above average" to 5 = "well below average": (1) employee productivity, (2) quality of work, (3) accuracy of work, (4) job knowledge, (5) efficiency of job duties, (6) general employee productivity, output quality, accuracy, and consistency; the scores on the six work quality items were averaged	Kieffer et al (2004) (reverse coding is required)
-performance (composite): nine-item scale based on the analysis of sales job; the nine dimensions were job knowledge, quality of work, quantity of work, initiative, customer communications, account management, interpersonal skills, commitment to job, and job attitude; each dimension was defined by a one-sentence description, followed by three or four interpretative examples illustrating important facets of that dimension; the participants' supervisors and coworkers rated the performance on a 5-point Likert-type scale ranging from consistently exceeds job requirements (1) to somewhat below job requirements (5); ratings were being collected for the research purposes; overall performance is the sum of the ratings across all dimensions	Mount et al (1994)
-performance (composite): eight performance dimensions as important for job success based on an analysis of the management jobs: (1) planning; (2) administration; (3) development; (4) communication; (5) coordination; (6) effort; (7) organizational commitment; and (8) know-how. Each supervisor rated the manager who reported to him/her on a 7-point scale which ranged from 1 = "consistently below" to 7 = "always exceeds job requirements;" items were summed to yield an overall performance score	Mount et al (1999)_Study 1
-performance (composite): an eleven-dimensional measure of job performance was developed based on a job analysis of the sales	Mount et al

representative jobs: (1) job knowledge; (2) quality of work; (3) quality of work; (4) initiative; (5) customer communications; (6) organizational commitment; (7) planning; (8) allocation; (9) interpersonal orientation; (10) self-development; and (11) account management; ratings were made on a 5-point scale ranging from 1= "somewhat below" to 5 = "consistently exceeds job requirements;" the eleven items were summed to yield and overall performance score	(1999)_Study 2
-performance (composite): eighteen performance dimensions based on job analysis to rate district managers; examples of the dimensions were: teamwork, motivates others, execution, manages conflicts, and so on; each dimension was accompanied by three examples to illustrate the meaning; ratings were made on a 5-point scale ranging from 1 = "not acceptable" to 5 = "far exceeded expectations;" items were summed to yield an overall performance score	Mount et al (1999)_Study 3
-performance (composite): supervisors rated multiple dimensions of performance; ratings were averaged or summed across dimensions to arrive at an overall measure of job performance	Robie & Ryan (1999)
-participants' immediate supervisor rated the participants' performance using eight semantic differential-type bipolar phrases (e.g., "does very high quality work-does very low quality work," "very dependable-very undependable"), each with seven response options	Shaw & Gupta (2004)_Study 3
-the evaluation instrument consists of 46 behaviors and characteristics, each considered to be a critical leadership competency -the evaluation instrument is developed for commercial use, therefore the results of the validation study were not published (Hagberg Consulting Group, 2002) -participants created their own rater lists, which might include supervisor, peer, or subordinate	Strang & Kuhnert (2009)
-overall performance: seven distinct and clearly defined aspects of job performance and one global dimension were provided by subjects' immediate supervisors using a five-point scale (1 = "low" to 5 = "high") with anchors customized to each dimension; raters were encouraged to consider ratees' performance over the preceding year, to distinguish clearly among the performance dimensions, and to consider the full scale in each case as appropriate	Tett et al (2003)
-employee performance was measured by Minnesota Satisfactoriness Survey (MSS) (Gibson, Weiss, Dawis, & Lofquist, 1977), which consists of twenty-eight items; MSS broadly defines performance, including assessments of the quality and quantity of an employee's work, and their overall dependability and promotability -supervisors were asked to rate each employee's efforts and outcomes in comparison to the rest of the work group	Westerman & Simmons (2007)
-performance (composite): nine items as a result of job analysis were used to assess job performance (e.g., "[employee name] gives accurate, objective information to customers" and "[employee name] keeps working even when others are standing around talking"); supervisors rated their employees on each item using the following scale: 1 = "weak or bottom 10%," 2 = "fair or next 20%," 3 = "good or next 40%," 4= "very good or next 20%," and 5 = "best or top 10%."	Witt (2002)_Study 2
-performance (composite): six generic job performance items assessed job performance (e.g., "[employee name] strives to meet deadlines"); supervisors rated their employees on each item using the following scale: (a) "weak or bottom 10%," (b)"fair or next 20%,"(c) "good or next 40%,"(d)"very good or next 20%," or (e) "best or top 10%."; responses were scored as 1,2,3,4,, and 5, respectively	Witt (2002)_Study 4
-performance (composite): supervisor evaluated on ten performance dimensions on a 7-point Likert scale, ranging from "strongly disagree" to "strongly agree"; the scores across the ten items were averaged to obtain the final score	Wright et al (1995)
Performance = performance (composite) (adopted the existing measures)	
-performance (composite): four items developed by Welbourne, Johnson, and Erez (1998) to measure executive performance; sample items included ratings of new executive "quality of work output" and "quantity of work output"; a 5-point scale, ranging from 1= "needs much improvement" to 5 = "excellent," was used to rate new executive job performance	Bauer et al (2006)
-in-role behavior: seven-item scale used by Williams and Anderson (1991)	Crant & Bateman (2000)
-in-role performance: measured by three items in-role performance measure developed by Williams and Anderson (1991): (1) this employee	Dirks &

fulfills the responsibilities specified in his or her job description; (2) this individual meets performance expectations; and (3) this individual performs the tasks that are expected as part of the job; a 7-point Likert-type scale was used	Skarlicki(2009)
-performance: measured by a modified version of a scale designed by Pearce and Porter (1986) for hotel employees for two reasons: (1) to examine specific behaviors relevant to the sample instead of a generic measure of performance; (2) a standardized measure of performance (because respondents were in different organizations and the measurement of performance across environments was not consistent) -participants rated their own behavior for overall job performance as well as facet measures of knowledge of hotel procedures, interactions with co-workers, dedication to the goals of the hotel, and quality of service provided to patrons; the items were scored on a 7-point scale that ranged from 1 = "very poor" to 7 = "outstanding"	Horchwarter et al (1999)
-performance (composite): three items to measure entry-level customer service managers overall job performance developed by Motowidlo & Van Scotter (1994); the overall performance score was created from the mean of these three variables due to the similarity in means and standard deviations across these three measures	Hunthausen, Truxillo, Bauer, & Hammer (2003)
-job performance: assessed by the four-item role-based job performance scale (Welbourne et al., 1998); this scale assesses how well one does things related to the job (e.g., "quantity of work output"); items were scored on a 5-point Likert scale using anchors ranging from 1 = "needs much improvement" to 5 = "excellent"	Lubber et al (2005)
-task performance and interpersonal skills were identified by PCA based on the peer ratings on the six performance dimensions (overall performance, problem solving, work procedures, and planning were loaded on one component identified as task performance; conflict resolution and team communication were loaded on the second component identified as interpersonal skills) (Hackman, 1987; Stevens & Campion, 1994); each rating was made on a scale ranging from 1 = "strongly disagree" to 10 = "strongly agree" -correlations between performance measures: (.06)	Neuman & Wright (1999)
-job performance: three items developed by Heilman, Block, and Lucas (1992): (1) this employee is very competent, (2) this employee gets his or her work done very effectively, and (3) this employee has performed his/her job well; the immediate supervisors were asked to assess the performance of each employee using a five-point Likert-type scale ranging from "strongly disagree" to "strongly agree"	Sy et al (2006)
-supervisory ratings of task performance were measured with Turnley et al's (2003) in-role performance scale (e.g., "this employee adequately completes all of his/her assigned duties")	Tsai et al (2007)
-job performance: Minnesota Satisfaction Survey (MSS) (Gibson et al., 1977); MSS broadly defines performance including assessments of the quality and quantity of an employee's work, and their overall dependability and promotability; the twenty-eight item instrument asks managers to rate each employee's efforts and outcomes in comparison to the rest of the work group; the reliability coefficients for the MSS range from .69 to .95, with a median of .87; MSS has demonstrated validity in longitudinal examinations of tenure and promotions across a variety of occupations.	Westerman & Simmons (2007)
Performance = performance (composite) (critical aspect(s) of the job)	
-service performance: 14 items; rated on a 5-point scale from 1(never or almost never demonstrated) to 5 (always or almost always demonstrated); sample item "handles complaints and problems effectively and in a courteous manger"; overall service performance rating was calculated by averaging the service items -sales performance: 18 items; rated on a 5-point scale from 1 = "never or almost never demonstrated" to 5 = "always or almost always demonstrated;" sample item "identifies policyholders' needs and sells additional coverage where needed"; overall sales performance rating was calculated by averaging the sales items -correlation between service performance and sales performance (.74)	Bergman et al (2008)_Study 1
-customer service performance (measured by four items) and sales performance (measured by four items); supervisory rating of these eight items on a scale from 1 = "performs significantly below expectations" to 4 = "performs at expected levels" to 7 = "performs significantly above expectations;" overall performance rating was also created and its correlation with personality was reported in addition to the	Conte & Gintoft (2005)

correlations between personality traits and customer service performance and sales performance respectively	
-customer service: six situational interview questions were converted to performance dimensions; six scores were combined to form an overall customer service performance criterion	DeGroot & Kluemper (2007)
-initiative: the participants working in organizations operated in dynamic, uncertain environments in which supervisors depended on employees to take initiatives in solving problems, voicing and implementing ideas, and expending additional time and energy at work beyond core task requirements; initiative is a critical dimension of work performance in such setting; measured by seven-item scale developed by Frese, Fay, Hilburger, Leng, and Tag (1997); sample items are "this employee takes initiatives immediately even when others don't" and "usually does more than s/he is asked to do"	Grant & Wrzesniewski (2010)
-perceived leaders effectiveness: three items: (1) To what extent is the overall functioning of the person you evaluate satisfactory? (2) How capable is person you are evaluating as a leader? and (3) How effective is the person you are evaluating as a leader? Responses were given on a 7-point response scale, ranging from 1 = "not at all" to 7 = "very much so" -rated by superiors and/or peers	de Hoogh et al (2005)
-customer service performance: a single seven-point scale, with general behavior illustrations anchoring its high and low ends	Motowidlo et al (2008)
-leadership effectiveness: nine-item scale that reflected the task, conceptual, and interpersonal aspects of leadership (e.g., planning and setting direction, delegating/assigning/coordinating tasks, and leading by example); supervisors rated subordinates on a 7-point Likert scale ranging from 1 = "very poor relative to his peers" to 7 = "very good relative to his peers"	Ng et al (2008)
-research performance: eight-item scale adopted from Tsui et al (1997); a sample item is "my quality of research is higher than average in my department"; possible responses ranged from 1 = "strongly disagree" to 5 = "strongly agree;" self rated -teaching performance: one-item overall rating given by the students; "overall, I rate the teaching of this course as ___" with possible responses ranging from 1 = "poor" to 5 = "excellent;" when a faculty member taught more than one course during that time period, his or her teaching performance score was the average rating across courses -correlation between performance measures: (-.02)	Orvis et al (2008)
-typical performance was measured at the end of the 3-month basic training program, where each candidate was given two overall leadership performance ratings, one from his supervisor and the other from his peers. The rating was based on a 0 to 100-point scale, with the higher number indicating greater leadership	Ployhart et al (2001)
-nomination: participants received an envelope and a sheet of paper with the following instruction: "if you were going to create and run your own company with a number of people of this organization, which individuals would you take with you, without a maximum or a minimum number". Participants received the explicit instruction to choose people not because they were friend but because of their good work. Nominations were categorical, ordinal judgments and ask for a clear and extreme distinction of people with outstanding performance in the organizational setting. The nomination score per participant was calculated as the percentage of number of nominations for him/her divided by the total number of people that received the envelopes and participated in the nomination processes	Ramo et al (2009)
-service performance: supervisory rating using three items developed from the extant literature (Witt et al., 2004; Cleveland, 2007): accuracy of information provided to customers, speed of response to customer request, and ability to solve problems. The items were measured on a seven-point scale ranging from 1 = "significantly below average" to 7 = "exceptional" -absenteeism: supervisory rating using a seven-point scale ranging from 1 = "significantly below average" to 7 = "exceptional" -intention to turnover: supervisory rating on the likelihood that the employee would actively look for a new job in the next year using a seven-point scale ranging from 1 = "significantly below average" to 7 = "exceptional;" study participants were asked to indicate their intent to turnover using the same scale; supervisory rating were used to avoid same source bias	Sawyerr, Srinivas, & Wang (2009)
-self-direction: four items on self direction: (1) comes up with new, original idea for handling work; (2) redesigns job tasks to better serve	Stewart et al (1996)

customers, even if it isn't required; (3) takes initiatives and does whatever is necessary to assure customer satisfaction; (4) goes against organizational expectations if he or she thinks it will result in better service for customers; these performance behaviors relate positively with customer satisfaction in service settings; each item was rated on a 5-point scale ranging from a low of 1 = "doesn't describe employee at all" to a high of 5 = "describes employee very well" -supervisory rating; ratings were obtained for research purpose only	
-leader performance: forty-six behaviors and characteristics to measure critical leadership competency (Hagberg Consulting Group, 2002); rated by superior, peer, and subordinates	Strang & Kuhnert (2009)
-leadership: five dimensions comprises the factor of leadership, which along with other three factors as the result of a factor analysis based on 19 performance dimensions identified by a large-scale job analysis	Van iddekinge et al (2009)
-production performance: five production items (e.g., "completes tasks on time," "fails to meet work deadlines") were developed for this study, and reflected time to task completion and quantity of completed work tasks; the items on the production scales were judged by subject matter experts (SMEs) (i.e., supervisors) to represent well the content of productivity performance within the current sample and work context; the scales used a 5-point Likert format (1 = "never" to 5 = "constantly") -supervisory rating	Wallace & Chen (2004)
-interpersonal facilitation: five-item scale developed by Ferris, Witt, and Hochwarter (2001); items were summed to yield a total score; rated by superior	Witt & Ferris (2003)_ Study1 & Study 2
-contextual performance: thirteen-item scale developed by Organ (1988); peer rated	Witt & Ferris (2003)_ Study 3
Performance = performance (composite) + performance (sales volume or other objective measures)	
-performance (composite): sales representatives were evaluated on eleven dimensions on the basis of job analysis (job knowledge, quality of work, quantity of work, initiative, customer communications, organizational commitment, job commitment, planning and allocation, interpersonal orientation, self-development, and account management); each dimension was defined by a one-sentence description, followed by three interpretative examples illustrating important facets of that dimension; supervisor rated participants on a 5-point Likert scale from "consistently exceeds job requirements" to "somewhat below job requirements"; overall performance was the sum across all dimensions -performance (sales volume): z score (the average of the salesperson's monthly sales over the past two quarters was subtracted from the mean sales of their geographic region, and this number was divided by the average standard deviation of the 14 geographic regions used by the firm) -correlations between these two performance measures: (.21)	Barrick et al (1993)
-sales performance: based on job analysis, four items developed to rate sales performance -customer performance: based on job analysis, four items developed to rate customer performance -overall performance: factor analysis of the eight performance ratings indicated that a unidimensional factor structure best fit the performance data; accordingly, a measure of overall job performance was also created -correlations between performance measures: overall performance with sales performance (.94), with customer performance (.94)	Conte & Gintoft (2005)
-effort: number of appointments and number of prospects -sales: total number of policies sold -correlation between performance measures: (.16)	Corr & Gray (1995)
-sales volume: insurance agents' sales performance was assessed by the annual dollar-value business that agents brought to the insurance agency in the year in which the study was conducted; this information was taken from company records -rated performance: on the basis of the reported yearly records of the agents' activities, sales volume performance, and productivity, the president of the agency rated each agent's performance on the following scale: 1= "not adequate for job," 2 = "below average," 3 =	Erez & Judge (2001)

"average," or 4 = "above average" -correlation between sales volume and rated performance (.55)	
-sales performance: averaging the ratio of actual sales to the monthly sales goal over six months; the sales goals were established through a participative process, during which incumbent sales workers and their supervisors agreed upon sales goals based on previous department and individual sales records (although the sales measure used in this study represents a measure of the outcomes of work-related behaviors rather than the behaviors themselves (Campbell et al., 1993, 1996), it is adjusted to address the most significant limitation of outcome measures by controlling for contamination due to situational factors that may influence sales volume) -OCB:10-item scales described by Becker and Randall (1994), a shortened version of an instrument developed by Smith et al (1983)	Hattrup et al (1998)
-goal: a sales target or goal set by the organization for each sales person -performance: actual financial performance of the sales staff -goal achievement: percent of goal achieved by the sales staff -correlations between goal and performance: (.91)	Jackson (2001)
-quality: based on individual call audits; an assessment of telephone techniques/communications skills, job knowledge, and paperwork errors -productivity: based on talk time (seconds/call) and after-call processing time (minutes/call) -conduct: assessed attendance/punctuality; professional behavior, maturity, and self-control; team-work; and showing initiative. -correlations between measures: conduct with productivity (.04), with quality (.38)	Reid-Seiser & Fritzsche (2001)
-call volume performance: average number of calls per quarter-hour from the call center's automated management information system; high scores reflect a greater number of calls being answered -customer service quality: supervisor periodically monitored phone conversations with customers and assigned an overall customer service quality rating, ranging from 1 = "fails to meet expectations" to 5 = "significantly exceeds expectations"; averaging customer service quality rating from the organization's archives -correlations between performance measures: (.12)	Witt et al (2004)
Performance = sales volume (or other objective measures)	
-car sold: the number of cars sold by the participant in the previous year and the average number of cars a salesperson had sold at their specific outlet in the previous year; this is a competitive measure of sales performance in line with socioanalytic theory (Hogan & Holland, 2003) and this measure reflects the fact that some dealership outlets have better selling conditions, which will impact salesperson performance	Blickle et al (2010)
-performance (objective archival data): three critical dimensions of each real estate agent for which objective archival data would be available: the number of house sold, the number of listings generated for the firm, and commission income; z score for each of the three performance dimensions were computed and then summed to create an overall performance rating	Crant (1995)
-sales target met: the organization assumed that all sales people have very similar sales opportunities so that their targets were similar -some account was made of the sales person's experience and those with more experience did have slightly higher targets, which does confound true performance and targeted performance; because this was the only data stored by the organization it was not possible to "unconfound" this problem	Furham & Fudge (2008)
-objective sales performance: one-year commission as a percentage of minimum performance threshold needed to attain a performance bonus; objective sales performance is closely related to the "bottom line" of the organization (Rich, Bommer, MacKenzie, Podsakoff, & Johnson, 1999)	Robie et al (2005)
-sales volume: the number of car insurance policy sales made by each individual telesales employees over 24 executive working days	Smillie et al (2006)
-performance measures consisted of (1) renewable percentage: the percentage of existing members making payment to renew their membership and (2) new members: the count of new members who had paid membership fee over a 9-month period	Stewart (1996)

-correlation between performance measures: renewable percentage and new members (-.14)	
-the sales representatives had to renew existing client memberships annually and recruit new members; however, during the probationary period many new sales representatives were limited in their opportunity to renew existing clients, meaning that new sales was the only performance dimension that could be properly tracked from both the transition and maintenance groups; territory differences and variation in time spent on training activities also differentially affected the selling opportunity of sales representative; these factors were controlled by adopting the number of new memberships sold per selling day as the performance measure and by statistically partialing out differences in market penetration	Stewart (1999)
-sales performance: the level of sales generated per customer served (i.e., an employee's total sales generated was divided by the total number of customer serviced); this data were collected one month after the collection of personality data	Tews et al (2010)_Study 2
-results-oriented (i.e., hard sales) criteria were used to operationalize job performance for both the maintenance and transitional samples; in the maintenance sample, the outcome measure was a simple count of territory sales aggregated on a quarterly basis such that performance was assessed at four points in time; in the transitional sample, performance was operationalized as quarterly product market share (raw sales divided by all sales in the given product class for each individual salesperson's territory) because of large differences in market size for products carried by this sample; although the scaling of the criterion measure was not strictly equivalent across samples, there is no reason to believe that raw versus market-adjusted sales figure differ from a construct perspective, and such market size adjustments are frequent in studies of sales success	Thoresen et al (2004)
-sales performance: number of cars sold in the last year adjusted by the size of a person's dealership (sample 1); sales relative to personal target in the last six months (sample 2); book sold in the last year as a proportion of average sales in the region (Sample 3)	Warr, Bartram, & Martin (2005)
-sales performance of car sales executives, retail sales employees, and door-to-door book salespeople	Warr, Bartram, & Brown (2005)
-overall sales performance: using the following scale: 1 = "weak or bottom 10%," 2 = "fair or next 20%," 3 = "good or next 40%," 4 = "very good or next 20%," or 5 = "best or top 10%;" supervisor-rated	Witt & Ferris (2003)_Study 4
Performance = assessment center	
-general factor -role play + oral presentation + written exercises: a task-based job analysis was used to develop the exercises and dimension included in the assessment center, which is typical of the design of many assessment center conducted in the U.S. (Eurich et al., 2006; Spychalski et al., 1997)	Lance et al (2007)
-performance (typical): hired candidates by annual supervisory ratings of work practices and procedures, planning and problem solving, group cooperation and cross-functional management, promoting safety, communication, personnel development, customer and supplier relations, and personal work style (related to assessment center dimensions) -performance (maximum): ratings of performance on various exercises in a 2-day assessment center (for the selection purpose): planning and organizing, coaching, results orientation, willingness to learn, team orientation, and communication	Marcus et al (2007)[a]
-performance: the mean of performance ratings on the two assessment center group exercises (the command task and the group discussion) was used as the performance criterion	Perkins & Corr (2006)
-performance (typical): measured at the end of the 3-month basic training program, where each candidate was given two overall leadership performance ratings, one from his supervisor and the other from his peers; the rating was based on a 0 to 100-point scale, with the higher number indicating greater leadership -performance (maximum): assessment center exercise results in five performance ratings, were obtained during the second month of basic training when candidates were required to participate in a 2-day assessment center exercise designed to tap leadership skills in a military	Ployhart et al (2001)[a]

context; each of the five performance dimension was rated on a 1 to 9-point scale, with higher numbers reflecting greater leadership; the scores for these leadership dimensions were subsequently aggregated to form an overall leadership score for each soldier	
Performance = training performance	
-performance (composite): seven scales representing important dimensions for training and flight attendant success (learning and applying knowledge, demonstrating responsible work habits, work-related communications, interpersonal skills, customer interaction, teamwork, and problem solving); the seven performance dimensions were equally weighted and combined into a composite measure -performance (overall): a global rating scale of overall training performance -for each of the seven general training performance dimension, 9-point behaviorally anchored rating scales were developed from a job analysis; in addition, there was a 9-point scale rating overall performance	Cellar et al (1996)
-supervisors rated the state police recruits as 1 = "satisfactory" or 0 = "unsatisfactory" on 21 dimensions at the end of their 6-months training at the academy; the ratings on 21 dimensions were combined into one scale -peers provided performance rating on 10 items on a 9-point, "low" to "high" scales (e.g., punctuality, professionalism, fairness, etc)	Cortina et al (1992)
-overall training score: 13 items on "maintaining order" and 13 items on "helping victims" were combined into an overall training score; "maintaining order and helping victims" are two of the most important aspects of police work -supervisor rating	De Meijer et al (2008)

a. When the primary study reported the correlation between personality trait and maximum performance rating as well as typical performance rating, the correlation with typical performance was used for mean effect size calculation. Ployhart et al (2001) argued that assessment center exercise results should reflect maximum performance because they meet the three characteristics of maximum performance defined by Sackett et al (1988): (1) participants were fully aware that they were being evaluated; (2) participants were given explicit instructions that the objective of the assessment center exercise was to evaluate their leadership performance, and (3) participants should exhibit leadership behaviors to the fullest extent possible; performance in the assessment center was measured over a reasonably short period of time and thus allowed candidates to remain focused on the goal of maximum performance.

APPENDIX D1

PERFORMANCE MEASURES (SOME SPECIAL CASES)

Performance Measures	Rated by	Why	Paper
Car sold	-both subordinates and their supervisor	The high correlation between self and supervisor reports of cars sold (.87) will considerably increase the confidence in the validity of the car salespersons' self-reports of cars sold.	Blickle et al (2010)
Job performance	-self (i.e., study participants report their annual performance score because the company did not allow the researchers access to personal files)	Because all responses were anonymous and the survey was purely for research purposes, the self-reporting of supervisory performance ratings was not expected to affect the quality of the criterion data.	Bajor & Baltes (2003)
Job performance	-supervisor and peer	Provide comprehensive development feedback to the participants	Barrick et al (2005)
Job performance	-supervisor, peer, subordinates -the average supervisor rating, the average peer rating, and the average subordinate rating were summed together and divided by three to arrive at a final overall job performance index	The low correlations between supervisor, peer, and subordinate ratings did not necessarily indicate that ratings from the three sources lack reliability or construct validity, as different sources likely have different valid perspectives on performance (Conway & Huffcutt, 1997) and provide incremental validity over each other (Conway, Lombardo, & Sanders, 2001).	Berry et al (2007) Blickle et al (2008)
Job performance	-performance rating weighted by the importance rating; weighting was done at the level of each rater -final performance rating was obtained through aggregating across all supervisor-, peer-, and subordinate-ratings available for a particular target participants; the weighted ratings were averaged for each target	As jobs were sampled from varying domains and the job performance demands typically differ within the same domain from job to job, the importance of each performance facet was also directly assessed by the raters; therefore, the rating of how well a job incumbent performed in a given domain was weighted by the importance rating of the respective aspect ranging from 0 (irrelevant) to 1 (highly relevant)	Blickle et al (2008)
Job performance	-self (i.e., the participants were asked to report the results of their most recent performance appraisal based on their memory): since it was unlikely that the employee remembered exactly what rating was achieved for each performance dimension, each respondent was required to "check out" his or her most recent appraisal form and reproduce the	This process of collecting performance data was the preferred method of the participating organization.	Byrne et al (2005)

	document on the survey		
Job performance	-self-rating -self-report the results of last performance appraisal	This type of assessment has been shown to correlate highly with supervisor evaluations of employee performance (Pearce & Porter, 1986); Mabe and West's (1982) review of the literature concluded that self-report measures of performance were more valid than noted in prior research. The self-assessment correlates highly with supervisor evaluations of employee performance	Hochwarter et al (1999)
Job performance	-self and coworkers -the scores were consolidated from all of the respondents (i.e. self and coworkers)	Conway and Huffcutt (1997) reported that multiple source provides unique perspectives and that composite measures across different sources are more reliable. Low to moderate intercorrelations among sources suggest that the sources do have common understandings of the constructs in question. The shared variance for each construct was highlighted through combining ratings across sources. This should reflect less of the idiosyncrasies of individual response biases	Shaffer et al (2006)
Job performance-customer service performance	-collected from both a store manager and an assistant store manager; when two ratings were available, the average score was used		Motowidlo et al (2008)
Leader performance	-supervisor, peer, subordinates	To provide a more comprehensive, reliable picture of an individual's performance (Dyer, 2001). The efficacy and utility of multisource feedback rely on an understanding of the nature of rating differences observed across rater levels (Borman, 1997): raters provide reliable ratings on dimensions for which they are in good position to make judgments of performance (Borman, 1974). The reasons on why customer ratings (Pollack & Pollack, 1996) and self-rating (Yammarino & Atwater, 1997; Alimo-Metcalfe, 1998; Harris & Schaunbroeck, 1988) were not collected as well as why the ratings of the same individual from different sources should be correlated with each other (Church, 2000; Sals & Dwight, 2002) were also explained in the paper.	Strang & Kuhnert (2009)
Overall performance appraisal and task performance	-a new measure was developed in addition to the one (i.e., overall performance appraisal) from company record	The overall performance appraisal, made a year before the study, may be subject to some limitations for the present research: (1) work performance might have changed; (2) single-item measure may lack sufficient reliability; (3) the appraisal had administrative (promotion and salary adjustment) purposes, the knowledge about which would probably affect raters.	Hui et al (2009)

APPENDIX E

SUMMARY OF PARTICIPANTS' OCCUPATIONS ACROSS PRIMARY STUDIES

Accountants (13-2011.01)_Job Zone 4	
-accountants from three accounting firms	Jenkins & Griffith (2004)
Bank/Financial Institute-All Levels	
-bank employees working full or part-time at a large Midwestern financial institute in a variety of jobs including management, analysts, and clerical positions	Bajor_Baltes_2003
-employees and supervisors of six regional banks in Germany; in terms of hierarchical level, 57% indicated that they held non-managerial positions, 18% held lower-level management positions, 23% were in middle management, and 2% worked in upper management	Bledow & Frese (2009)
-community bank employees at all levels of the organization from a small city in the Central U.S.	Jackson & O'leary-Kelly (2003)
Bank/Financial Institute-Financial Managers, Branch or Department (11-3031.02)_Job Zone 4	
-managers employed by a Puerto Rican financial services organization	Crant & Bateman (2000)
-middle managers from a Spanish financial services organization (a savings and loan institution) with around 2,700 employees; middle managers carry out the following functions as their main duties: providing financial services to customers, directing and coordinating a group of employees, assisting in cash management activities, examining documents prepared by subordinates and ensuring that the security procedures are followed; examining, evaluating, and processing loan applications, and preparing, typing and maintaining records of financial transactions; the middle manager is in charge of the office when the Director is absent	Salgado & Rumbo (1997)
Bank/Financial Institute-Sales Agents, Financial Services (41-3031.02)_Job Zone 4	
-employees at a bank's financial services department in Western Canada; their primary role was to provide financial services (loans, mortgages, and investment securities) to residential and commercial clients	Dirks & Skarlicki (2009)
Bank/Financial Institute-Tellers (43-3071.00)_Job Zone 2	
-credit union tellers in a large financial company in the Rocky Mountain region in U.S.	Barrick & Zimmerman(2009)
Bus Drivers/Bus Operators (53-3021.00)_Job Zone 2	
-bus operators from nine bus properties from across the U.S. and Canada	Jacob et al (1996)
Business Teachers, Postsecondary/Faculty Members (25-1011.00)_Job Zone 5	

-newly hired faculty members in a large, mid-Atlantic university: assistant professor was the dominant job classification (64.2%) and the rests were associate professor, instructor, and professor -more than 25 different academic departments were represented in the sample	Orvis et al (2008)
Child Care Workers/Camp Counselor (39-9011.00)_Job Zone 2	
-camp counselors employed at six different summer camps in the Southeastern U.S.; within each camp, the counselors served as guides and attendants to groups of approximately four to six campers of equal or near equal ages, and were responsible for the instruction, care, and wellbeing of these campers; counselors cooperated with other counselors guiding similarly aged campers to organize multi-group activities, such as mountain hikes, canoe trips, inter-group sports, and mealtime gatherings; therefore, counselors were differentiated in their roles as they guided and were responsible for separate groups of campers, and yet also interdependent when accomplishing camp tasks and activities that required multiple groups of campers	Bing & Burroughs (2001)
-camp counselors in a girl's summer camp operating in a state in the southeastern U.S.	Loveland et al (2005)
Clerk/Office Clerks, General (43-9061.00)_Job Zone 2	
-support staff employees of agents who sell financial and insurance products for a large Midwestern company	Bergman et al (2008)_Study 1
-an international financial services firm -working in clerical-type transaction processing, interacting more with internal associates than external customers	Burke & Witt (2002)
-entry-level employees in the Singapore Civil Service who are in administrative positions that provide staff support to the variety of functions in the civil service	Chan & Schmitt (2002)
-entry-level agents in a government agency	Clevenger et al (2001)_Study 1
-employees from a private sector document processing organization	Colbert & Witt (2009)
-employees in a systems development organization	Ferris et al (2001)
-early entry employees in a large public service organization	Griffin & Hesketh (2004)
-clerical employees of a Southeastern state government agency who complete fairly routine or standardized tasks, which include maintaining a filing system, entering data into a computerized database, completing required office records making copies, answering telephones, and sorting mail -the employees are given a limited choice of action regarding when and how tasks are to be completed (i.e., the supervisor typically gives comprehensive detailed instructions for the tasks)	LaHuis et al (2005)
-nonsales office workers across 15 organizations	Witt (2002)
Computer Programmers (15-1021.00)_Job Zone 4	
-programmers in a systems development organization	Ferris et al (2001)
Computer Support Specialists (15-1041.00)_Job Zone 3	

-information technology employees of a multinational company	Griffin & Hesketh (2004)
-employees of a computer software firm, which is a supplier and developer of software systems based in the Southwest U.S. -the sample consisted of programmers, software support, and client support, with all jobs fairly technical in nature -working in groups that were highly interdependent, requiring cooperation to meet the specific needs of their clients	Jackson et al (2006)
Customer Service Representatives / Hotel Employees-All Levels (43-4051.00)_Job Zone 2	
-a U.S. based international transportation company -the customer service positions involved leadership, service, and a high degree of customer contact	Clevenger et al (2001)_Study 2
-entry-level customer service managers in a major U.S. airline at airports within the U.S.	Hunthausen et al (2003)
-customer service representatives at a national insurance company	Reid-Seiser & Fritzsche (2001)
-employees working in a variety of jobs including food preparation and service, housekeeping, and clerical positions in a hotel/resort community located in the southwestern U.S.	Stewart et al (1996)
-employees from an elite hotel and resort community located in the southwestern U.S.; these participants were employed in a variety of service jobs including food preparation, food service, housekeeping, golf course maintenance, and cashier services	Stewart & Carson (1995)
-employees employed full-time by a private sector wholesale distribution services organization in the U.S. -the employees perform either administrative transactions or manual labor involved in pulling/fulfilling customer orders	Witt & Carlson (2006)
Engine and Other Machine Assemblers (51-2031.00)_Job Zone 2	
-plastic injection-molding automobile parts manufacturing workers, job # 556.685-022 (U.S. Department of Labor, 1977) from three companies, one with two separate sites; all companies were privately held and located in the Midwestern U.S.	Hayes et al (1994)
-factory floor workers including assemblers, laborers, fabricators, machine operators, crew leaders, supervisors, and employees holing other factory floor positions	Higgins et al (2007)
-manufacturing workers from seven different organizations: two heavy truck manufacturers, one truck engine manufacturer, one customer engineered materials manufacturer, one fiberglass and flat glass manufacturer, one electronics/communications manufacturer, and one television manufacturer -all participants were entry-level assembly or manufacturing employees	O'Connell et al (2007)
Engineers - Electronics Engineers (17-2072.00)_Job Zone 4	
-engineers of an electronic product manufacturer in Taiwan	Hui et al (2009)
Engineers - Industrial Engineers (17-2112.00)_Job Zone 4	
-engineers from one division of a multinational conglomerate	Kamdar & van Dyne (2007)
Engineers - Manufacturing Engineers (17-2199.04)_Job Zone 4	
-employees from engineering department	Anderson et al

	(2008)
-engineering positions in a large manufacturing organization in the Midwest	Clevenger et al (2001)
Executives-Chief Executives (11-1011.00)_Job Zone 5	
-a Fortune 500 pharmaceutical organization -job titles held by the executives included director, associate director, senior manager, and vice president	Bauer et al (2006)
-participants were employed by different organizations -manager-level positions (11%), director-level positions (22%), vice president-level positions (37%), president-level positions (1%), officer-level positions (e.g., CEO, CFO) (4%), 25% of the participants did not report their job level	Strang & Kuhnert (2009)
Expatriates/Computer Systems Analysts (15-1051.00)_Job Zone 4	
-all current American expatriate employees from a large multinational company based in the U.S.: 85% of the participants are technical expatriates held the following four job titles: systems analyst, senior systems analyst, systems engineer, and senior systems engineer; they work on client sites and were selected for their computer programming information technology skills (i.e., computer systems engineers/architects); 15% have various management positions with idiosyncratic titles, such as VP of Europe, Training manager, director of operations, and the like	Caligiuri (2000)
Expatriates/ General and Operations Managers (11-1021.00)_Job Zone 3	
-Arab expatriates, all managers in either operations or project management function, from one organization with headquarters in the Middle East	Dalton & Wilson (2000)
-expatriates from 20 countries in Hong Kong -most were in middle (36%)-to senior (50%) level-management positions, and the remaining were in lower management (5%) and technical (9%) positions (i.e., industrial production managers)	Shaffer et al (2006)
Field Representative/Electronic Home Entertainment Equipment Installers and Repairers (49-2097.00)_Job Zone 3	
-field representatives from an American media research company; their responsibilities include installing television monitoring equipment in people's homes, gaining permission to install that equipment, and training others	Tett et al (2003)
Flight Attendants (39-6031.00)_Job Zone 2	
-flight attendant trainees at a large international airline -a six-week initial training program for domestic flight attendants	Cellar et al (1996)
Helpers – Production Workers (51-9198.00)_Job Zone 1	
-employees in a distribution services organization	Horchwarter et al (2000)
Hotel Managers/Lodging Managers (11-9081.00)_Job Zone 3	
-managerial employees in the hotel industry throughout the southwestern, southeastern, and northeastern U.S.	Hochwarter et al

	(1999)
Human Resources Managers (11-3040.00)_Job Zone 4	
-highest ranking human resource (HR) or personnel managers in the largest (Class I and Class II) motor carrier organizations in the U.S.	Shaw & Gupta (2004)_Study 1
Human Resource Representatives/Human Resources Assistants (43-4161.00)_Job Zone 3	
-full-time human resource representatives at local stores, across the U.S., of a large, wholesale department store organization; they were responsible for fulfilling personnel-related functions at the retail store level: interacting frequently with other employees in the organizations; executing considerable discretion in interpreting employee compliance with organizational benefit regulations; as much as 75% of each HR representative's time was involved with processing compensation claims, paid holidays requests, and vacation benefits requests	Neuman & Wright (1999)
Industrial Machinery Mechanics/Military Mechanics (49-9041.00)_Job Zone 3	
-mechanics from U.S. Air Force; they are responsible for aircraft, ordnance, and armament system	Van Scotter & Motowidlo (1996)
Insurance Sales Agents (41-3021.00)_Job Zone 4	
-insurance agents from a regional division of a Fortune 500 company in the insurance industry located in the southeastern U.S.	Erez & Judge (2001)
-insurance sales representatives hired by one of five companies participating in the study	McManus & Kelly (1999)
-sales representatives for a long-term disability insurance company that sold its products throughout the U.S. and Canada -the company in the current study did not utilize sales teams; instead, the sales jobs were designed such that each salesperson was wholly responsible for his or her own territories -the participants retain the following job titles: account executive (12%), senior account executive (17.3%), sales associate (18%), sales consultant (6.8%), senior sales consultant (45.9%)	Robie et al (2005)
-sales agents for insurance companies in Taiwan	Tsai et al (2007)
Laboratory Technicians (29-2012.00)_Job Zone 3	
-employees of a privately owned pathology laboratory in the South-eastern U.S.	Cropanzano et al (1993)
Law Enforcement Officers/Police Officers /Police Patrol Officers (33-3051.01)_Job Zone 3	
-state police recruits from four different training schools who entered a Midwestern state policy academy	Cortina et al (1992)
-trainees who had been admitted to the police officer training	De Meijer et al (2008)
-law enforcement officers who participated in the assessment center as part of a promotional system conducted by a service unit of a large state university in the Southeastern U.S.	Lance et al (2007)

-candidates held the ranks of corporal, sergeant, and sergeant first class	
-police officers from a single northern Kentucky county that borders Ohio	Sanders (2008)
Loss Prevention Management Employees/Security Guards (33-9032.00)_Job Zone 2	
-employees in two levels of loss prevention management within a large mass merchandizing retail organization	Weekley & Ployhart (2005)
Management Analysts/Consultants (13-1111.00)_Job Zone 4	
-employees from consulting firm	Anderson et al (2008)
Managers (First-Line Supervisors/Managers of Production and Operating Workers) (51-1011.00)_Job Zone 3	
-team leaders and supervisors with the potential for executive promotion from two Japanese manufacturing companies located in the Southern Appalachian region of the U.S.; both companies are considered classical Japanese companies in their general business approach, employment practices, and socialization of employees. For example, they emphasize total quality management, kaizen production process, consensus-based team decision-making, long-term employment, provision of precooked rice and noodle lunches in the cafeteria, and even after-hours karaoke singing	Bing & Lounsbury (2000)
-applicants for management positions in a large forestry products organization	Goffin et al (1996)
Managers, All Others/General Manager and Operations Manager (11-1021.00)	
-non-academic supervisors from a large Midwestern university who managed other individuals, not technical functions (e.g., computer system administrators); their departments included building services, housing, grants and contracts, and student affairs	Bergman et al (2006)
-managers from a large Midwestern university	Bergman et al (2008)_Study 2
-managers (middle managers) from six different companies from the technical sector (e.g., automotive engineering, nanotechnology) and the service sector (e.g., mail order business, financial service)	Bergner et al (2010)
-managers at a large energy company participated in a leadership development program	Berry et al (2007)
-managers participated in a one-day assessment for evaluating managerial potential at a psychological consulting firm -the managers were employed in a diverse cross-section of areas (e.g., production, sales, engineering, finance, human resource management), and organizational levels (28% higher-level managers, 57% middle-level managers, 13% lower-level managers)	de Hoogh et al (2005)
-middle-level, civilian managers from the U.S. Army Management Training Activity Department	Barrick & Mount (1993) Mount et al (1999)
-mid-level managers in a large Canadian forestry products organization	Marcus et al (2007)
-middle managers with positions at organizational levels above front-line supervisors but below the level of vice president at a large energy company; some were plant general managers, and others held managerial positions in a wide range of departments such as human resources, information technology, finance, and public affairs and regulatory services	Oh & Berry (2009)

-tenured employees (managers and non-managers) assume managerial tasks in their job positions from three public institutions in Spain; the mission of two of the three public institutions is the representation, defense and promotion of the general interest of trade, industrial and service organizations located in the region where they operate; the third company is a public institution of energy sector	Ramo et al (2009)
MBAs-First-Line Supervisors/Managers of Office and Administrative Support Workers/Team Leaders (43-1011.00)_Job Zone 3	
-executive MBA students enrolled in an organizational behavior class -holding a wide variety of jobs, including finance and tax (15%), administrator and supervisors (30%), field service and engineering (12%), legal (6%), human resource (5%), manufacturing (12%), and marketing (21%) -with respect to job level, 40% were non-management and 60% were management	Barrick et al (2005)
-managers enrolled in a part-time executive MBA course; these managers work in a variety of functional areas, including sales and marketing (23.3%), production and operations (18.4%), finance (17.5%), general manager (13.6%), accounting (7.7%), human resources (3.9%), and information technology (2.9%). Their primary industries were financial services (21.4%); manufacturing; production, engineering, packaging, and construction (18.4%); professional services such as consulting, advertising, legal, and information technology (18.4%); telecommunications (7.8%); pharmaceuticals and medicine (6.8%); retail and consumer products (5.8%); government, education, and public service (4.9%); and travel and transportations (3.9%)	Grant et al (2009)
-full time and part time employees who were registered for graduate business courses at a university in a major metropolitan area in the U.S.; participants-reported job titles were generally of a professional or white-collar nature (e.g., consultant, executive recruiter, general manager, accountant), but also included part time and blue-collar occupations (e.g., waiter, construction worker, customer service representative)	Shaw & Gupta (2004)_Study 2
Medical Interns / Internists, General (29-1063.00)_Job Zone 5	
-first-year medical interns working in the public hospital system	Griffin & Hesketh (2004)
Military	
-National Guardsmen from a mechanized infantry unit located in the Northeastern U.S.; these guardsmen were organized in squads (i.e., teams) of approximately nine to twelve men, with approximately three squads to a platoon, and three to four platoons to a company; members of these squads were required to fulfill their individual and unique duties by coordinating and interacting with other members to accomplish squad level goals that could not be accomplished via members acting in isolation	Bing & Burroughs (2001)
-military recruits from the Singapore Ministry of Defense (i.e., Singapore male citizens who had enlisted for compulsory military service)	Ng et al (2008)
-candidates attending the Admiralty Interview Board (a well-validated assessment center used to select Royal Navy Officers)	Perkins & Corr (2006)
-military recruits undergoing training in the Basic Military Training Center of the Singapore military; these recruits were Singaporean men who were enlisted for compulsory National Service	Ployhart et al (2001)
-front-line leaders in the U.S. Army: noncommissioned officer (NCOs) who were sergeants with a rank of E5 -NCOs represented a range of military occupational specialties (MOS), including jobs related to combat operations, logistics,	Van Iddekinge et al (2009)

and administration.	
Nurse/Registered Nurse (29-1111.00)_Job Zone 3	
-nurses in a variety of areas from a medium-sized (225 beds) hospital located in the Southeastern U.S.	Cropanzano et al (1993)
Postal Service Clerks (43-5051.00)_Job Zone 2	
-temporary hiring staff from post offices	Mabon (1998)
Real Estate Sales Agents (41-9022.00)_Job Zone 3	
-real estate agents in a medium-sized Midwestern city	Crant (1995)
Repair Generalist / Maintenance and Repair Workers, General (49-9042.00)_Job Zone 3	
-a large university facilities department located in the Southeast U.S. -repair generalists who are required to complete numerous tasks that mandate quick results (e.g., fixing electrical problems, plumbing issues) and are potentially dangerous (e.g., electrical, mechanical, plumbing work; operating heavy equipment such as bulldozer; boiler room work)	Wallace & Chen (2006)
Residential Advisors / Resident Assistants (39-9041.00)_Job Zone 3	
-resident assistant (RA) from a large, private, and primarily resident university located in the Northeast -RAs are front-line student leaders working and living with other students in college and university residence halls. -RAs perform a multitude of tasks and roles involving a wide array of responsibilities: RAs serve as counselors for students, enforce policies, and function as role models; RA are in a highly active and visible leadership role incorporating considerable social interactions and swift decision making	Deluga & Masson (2000)
Restaurant Employees/ Waiters and Waitress (35-3031.00)_Job Zone 1	
-restaurant employees at nine different locations of a national restaurant chain	Byrne et al (2005)
-food employees from restaurant franchise	Sy et al (2006)
-restaurant servers from two casual-theme restaurants in U.S.	Tews et al (2010)
Retail Salespersons (41-2031.00)_Job Zone 2	
-salespersons from a German automobile manufacturing company that produces high-quality, expensive limousines with a conservative style; 81.25% of the participants worked in company outlets (i.e., local dealership outlets that sell automobiles manufactured by this company owned by this company) and 18.75% worked in free outlets (i.e., local automobile dealership outlets not owned by the manufacturer)	Blickle et al (2010)
-retail sales associates employed by a computer organization	Conte & Gintoft (2005)
-store associates from sixteen of the various stores in the chain	DeGroot & Kluemper (2007)

-sales associates of a large home improvement retail organization	Fallon et al (2000)
-sales consultants (i.e., sell Health Club Memberships) at Holmes Place Health Clubs in London (Great Britain), a leading chain of private health and fitness clubs	Furnham & Fudge (2008)
-entry-level customer service and sales representatives from several stores of a retail chain located in Mexico	Hattrup et al (1998)
-retail store associates from 12 different store branches	Motowidlo et al (2008)
-sales representatives contact and renew existing members and identify and add new members -the business representing a coalition of enterprises organized for the purpose of political activation; this business works with government representatives to lobby for and protect the interests of its members and to provide a number of support services to coalition members	Stewart (1996) Stewart (1999)
-sales executives of a car detailer in the United Kingdom; staff worked independently with retail customers, selling new or second-hand cars, arranging part-exchanges, and negotiating financial arrangements	Warr, Bartram, & Martin (2005)_Study 1
-retail sales employees of a British company selling electrical goods; the company encouraged competition between sales staff, and sought to motivate them through difficult personal goals	Warr, Bartram, & Martin (2005)_Study 2
-employees engaged in store-level jobs (e.g., checkout counter associate, stocking/receiving associate, general sales associate) from five different retail organizations. Though the jobs differed somewhat in terms of primary responsibilities, all required judgment in dealing with customers, coworkers, and loss-prevention situations	Weekley et al (2004)
Sales Representatives, Wholesale and Manufacturing, EXCEPT Technical and Scientific Products (41-4012.00)_Job Zone 3	
- a large appliance manufacturing organization -wholesale (i.e., customers were appliance dealers rather than actual customers)	Barrick, Mount, & Strauss (1993, 1994) Mount et al (1994, 1999_Study 2)
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific products (41-4011.00)_Job Zone 4	
-sales representatives in a large pharmaceutical firm headquartered in the U.S. -job responsibilities include gaining access to potential client physicians, detailing or educating physicians as to the indications for particular products, and strategic targeting of high-potential physicians in one's sales territory	Thoresen et al (2004)
-sales staff working within the southern customer business unit in the UK -'blue chip' company provides one of the widest range of document processing and management solutions in the industry; the UK is managed by six customer business units located around the country and each covers a set geographical area; all the sales managers and sales executives are paid on a commission basis determined by their performance against set targets	Jackson (2001)
Salesperson-Door-to-Door Sales Workers, News and Street Vendors, and Related Workers (41-9091.00)_Job Zone 2	
-participants hired by a German company; selling books on a person-to-person basis by calling on potential buyers at home or elsewhere	Warr, Bartram, & Brown (2005) Warr, Bartram, &

	Martin (2005)
Social Service Employees-Child, Family, and School Social Workers (21-1021.00)_Job Zone 4	
-participants from a public service organization in the Midwestern U.S. that focused on promoting children's health -participants were responsible for meeting with children to understand their physical and psychological health needs and coordinating care with families	Grant & Wrzesniewski (2010)
Social Service Employees-Eligibility Interviewers, Government Programs (43-4061.00)_Job Zone 3	
-employees from a local social services department in the Netherlands -their job was to carry out the Law on Social Security Benefits: (1) handling applications for social benefits; (2) collecting client data; (3) entering and reporting these data; (4) consultancy; and (5) doing re-examinations	van Yperen (2003)
Social Service Employees-Social Workers, All Others/Social and Human Service Assistants (21-1093.00)_Job Zone 3	
-participants from a public service organization in the Northwestern U.S. that focused on national security issues -participants were responsible for monitoring for environmental threats and performing safety checks	Grant & Wrzesniewski (2010)
-individuals employed within a public sector, social welfare department of a major metropolitan city in California; these departmental employees were classified as professional (e.g., 4-year college degree requirement) and all performed their job duties under the same general job description; 65.4% of the participants were social welfare staff	Wright & Staw (1999)_Study 1
-social services staff personnel from a county agency located in the northern California; respondents were well-educated, over half having a Master's degree or equivalent (the agencies require a minimum of a Bachelor's degree)	Wright & Staw (1999)_Study 2
Stock Clerks-Stockroom, Warehouse, or Storage Yard (43-5081.03)_Job Zone 1	
-warehouse workers in a food distribution company located in the Midwest	Mount et al (2008)
-warehouse workers from a Midwestern parts distribution center of a Fortune 500 manufacturer of home appliances -while approximately 11 different job categories were identified, all employees were classified with the title "warehouse" and subdivided as either a picker or packer. The only distinction between these two categories is that pickers operate tuggers (i.e., electric carts) while packer do not. Further, all workers were frequently required to rotate among jobs -management at the warehouse was planning a major technological change, moving to a totally automated warehouse system	Wright et al (1995)
Telemarketers (41-9041.00)_Job Zone 2	
-telemarketing sales representatives at a large financial service company -received inbound calls from perspective buyers and followed structured procedures to obtain needed information and generate sales	Barrick et al (2002)
-telesales agents in the insurance industry and came from various parts of the organization, but mainly the service (50.7%) and sales (20.7%)	Furnham et al (1999)
-participants from eight call centers in five companies in the insurance and telecommunications industries -the call centers surveyed were cost centers and the employees were principally engaged in providing information in response to customer calls	Sawyerr et al (2009)

-telesales staff selling car insurance policies directly to callers who were responding to various marketing campaigns -the volume of work entering the office was distributed among all employees	Smillie et al (2006)
-customer services representatives working in a call center of a health maintenance organization -the representatives received calls from customers who called with questions and problems associated with their health care and insurance coverage	Witt (2002)
-call center customer service representatives of a financial service institute	Witt et al (2004)
Train Operators/Subway and Streetcar Operators (53-4041.00)_Job Zone 2	
-train operators employed by a large Transit Authority -the job of operating public transit vehicles (i.e., trains, trams, and buses) places strict temporal demands on the employee	Conte & Jacob (2003)
Mixed	
-study participants worked mostly in realistic, social, enterprising, and conventional jobs; a few participants are from investigative and artistic jobs in the middle Rhine area (Cologne, Bonn).	Blickle et al (2009)
-persons who are currently active in the working world for at least 12h a week in the city triangle of Cologne, Bonn and Dusseldorf, which is an economically leading region of western Germany -participants were active in conventional, social, or enterprising jobs, or a combination of these three types of jobs	Blickle et al (2008)
-incumbent employees in nine organizations spanning various industries including manufacturing, health care, education, information services, and publishing -the size of participating organizations ranged from small businesses to branches of multinational companies and were located in various regions of the U.S. -the most common O*NET occupational areas in the incumbent sample were: production and manufacturing (49.5%), computers and mathematics (14.8%), and transportation and material moving (13.9%)	Casilla et al (2009)
-in a large public university -occupations were represented as follows: building and ground cleaning (1%), business and financial operations (7%), computer and mathematical (16%), education, training, and library (28%), installation, maintenance, and repair (1%), management (21%), office and administrative support (23%), personal care and service (1%), protective service (2%)	Cote and Miners (2006)
-employees in several different sectors and job positions in the Netherlands including a municipal theater, a dentist's practice, a daycare center, a consultancy firm, a studio, a tax office department, an elementary school, the logistics department of a ministry, the financial department of a regional police office, and an insurance company	Demerouti (2006)
-participants hold a wide variety of occupations (with a total of 65 organizations represented, with no more than 12 participants from any one organization): childcare worker, hairdresser, outside salesperson, retail clerk, office worker, supervisor, production worker, photojournalist, nurse, accountant, maintenance worker, bank teller, rehabilitation counselor, professor, and manager	Fisher (2003)
-salaried employees from the administrative branch of a midsized manufacturing corporation including employees in administration and sales (25%), in customer service (44%), in secretarial-basic series (16%), and in management (15%)	Higgins et al (2007)
-full-time employees in Singapore worked in a variety of industries and occupations (30.9% service industry, 12.7% government, 11.5% financial industry, 7.3% manufacturing industry, 4.2% transportation industry, 1.8% human services, 31.6% other); the majority of the participants were in non-managerial positions (55.8%) with fewer participants in first-(12.7%), middle-(23.6%), or upper-level (4.2%) managerial positions (3.6% of respondents did not report organizational level)	Greguras & Diefendorff (2010)

-participants working in computer technician/support, human resources, clerical supervisory, administrative support, contracting/procurement, and inventory management positions within a large national organization	Kieffere et al (2004)
-participants were employees of a large public organization in the Midwest; their jobs ranged from low levels of complexity (e.g., receptionists, typists, drivers, custodians) to relatively high levels of complexity (e.g., computer programmers, accountants, training specialists, engineers)	Le et al (2010)_Study 1
-employees from 25 organizations spanning different industries (e.g., health care, manufacturing, construction, testing, construction services) and educational institutions (high schools and community colleges); the organizations, ranging from small businesses to branches of multinational companies, are located throughout the U.S.; participants held a wide range of occupations, including production, food preparation and service, installation and maintenance, office and administrative support, health care education, training, library, education, and management	Le et al (2010)_Study 2
-young workers working full time on a 4-month work term as part of a post-secondary cooperative education program at two large Canadian universities	Lubbers et al (2005)
-participants working in various occupations, such as teachers, managers, accountants, sales/insurance, etc -participants from 22 small and medium firms in Athens, Greece, were randomly drawn based on Greek and European business guides	Nikolaou (2003)
-workers engaged in a wide range of occupations, including customer service (24%), sales (49%), management (lower, middle, and upper), and finance	Piedmont & Weinstein (1994)
-participants were from three organizations (a hospital and two automotive suppliers) who participated in a longitudinal study; the organizations represented a convenience sample, but within organizations, departments or units were selected based on several criteria including accessibility, range of jobs, and size. Within each department, all supervisors were included in the sample; nonsupervisory employees were sampled randomly; respondents in the study held various types of jobs and were reasonably similar to the demographic profile of the national labor force at the time (Glick et al., 1986)	Shaw & Gupta (2004)_Study 3
-a variety of occupations from a variety of organizations -most worked in sales or service positions (25%), clerical jobs (21%), or professional or technical fields (14%); the rest were spread across other occupations, including skilled and unskilled laborers, health care professionals, educators, and management	Small & Diefendorff (2006)
-employees from eight different organizations located in western U.S., representing financial analysts, direct-sales representatives, telemarketers, information systems specialists, customer service personnel, and stock clerks	Westerman & Simmons (2007)

Note.
a: Call center employees/telemarketers: though call center employees spend most time dealing with customer services or sales, O*NET lists it as a distinct category of occupation, separating it from customer service and sales positions.
b. Membership sales representatives were categorized as retail sales persons (41-2031.00) (i.e., sell such merchandise as furniture, motor vehicles, appliances, or apparel in a retail establishment). Other sales-related positions: (1) sales representatives, wholesale and manufacturing, technical and scientific products (41-4011.00) (i.e., sell goods for wholesaler or manufacturers where technical or scientific knowledge is required); (2) sales representatives, wholesale and manufacturing, except technical and scientific products (41-4012.00); (3) insurance sales agents (41-3021.00); and (4) real estate sales agents (41-9022.00).
c. Bank employees: sales agents, financial services (41-3031.02), financial managers, branch or department (11-3031.02), tellers (43-3071.00), new account clerk (43-4141.00), statement clerk(43-3021.01), and loan interviewers and clerks (43-4131.00).
d. Hotel employees: front desk clerks (43-4081.00), food servers (35-3041.00), housekeeping (37-2012.00), concierge (39-6012.00).

e. Managers: only if the primary study gives detailed information on the duties and responsibilities of the managers, managerial position was categorized as "general and operations managers" (11-1021.00) (i.e., plan, direct, or coordinate the operations of companies; duties and responsibilities include: formulating policies, managing daily operations, and planning the use of materials and human resources, but are too diverse and general in nature to be classified in any one functional area of management or administration; median hourly wage, $44.55; job zone: 3; SVP range: 6.0 to < 7.0). Examples of studies provide detailed managerial position descriptions: Shaw & Gupta (2004)-HR managers (11-3040.00); Hochwarter et al (1999)-lodging manager (11-9081.00); Hunthausen et al (2003)-first-line supervisors/managers of office and administrative support workers (43-1011.00) (i.e., office manager, team leader, customer service manager/supervisor); first-line supervisors/managers of helpers, laborers, and material movers, hand (53-1021.00) (i.e., floor supervisor, front line supervisor, production supervisor); and first-line supervisors/managers of production and operating workers (51-1011.00).
f. Engineers: industrial engineers (17-2112.00) (i.e., design, develop, test, and evaluate integrated systems for managing industrial production processes including human work factors, quality control, inventory control, logistics and material flow, cost analysis, and production coordination); mechanical engineers (17-2141.00) (i.e., performing engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment); electrical engineers (17-2071.00) (i.e., design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use); and manufacturing engineers (17-2199.04).
g. Technicians: industrial engineering technicians (17-3026.00) (usually working under the direction of engineering staff); manufacturing production technicians (17-3029.09); and mechanical engineering technicians (17-3027.00).
h. Loss prevention management employees: in O*NET, the closest occupation to "Loss prevention management employees" is "Loss prevention specialist" (33-9099.02). However, O*NET does not provide the KSA or job zone information for this occupation.
i. Workers: helpers-production workers (51-9198.00) (i.e., factory laborer, factory worker, machine operator); and laborers and freight, stock, and material movers, hand (53-7062.00) (i.e., all unskilled manual laborers not elsewhere classified).
j. Mixed: the range of occupational variety varies across samples. The following is the list of the papers where the study participants holding different jobs yet can be reasonably categorized into one occupation: (1) Weekley et al (2004): retail store employees engaged in store-level jobs, including checkout counter associate, stocking/receiving associate, general sales associate; (2) Stewart et al (1996): hotel employees working in a variety of jobs including food preparation and service, housekeeping, and clerical positions; and (3) Bajor & Baltes (2003): bank employees work full or part-time at a financial institute in variety of jobs including management, analysts, and clerical positions.
k. social and community service managers (11-9151.00) (i.e., plan, organize, or coordinate the activities of a social service program or community outreach organization; work may involve directing social workers, counselors, or probation officers); social and human service assistants (21-1093.00) (i.e., assist professionals from a wide variety of fields, such as psychology, rehabilitation, or social work, to provide client services, as well as support for families)

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